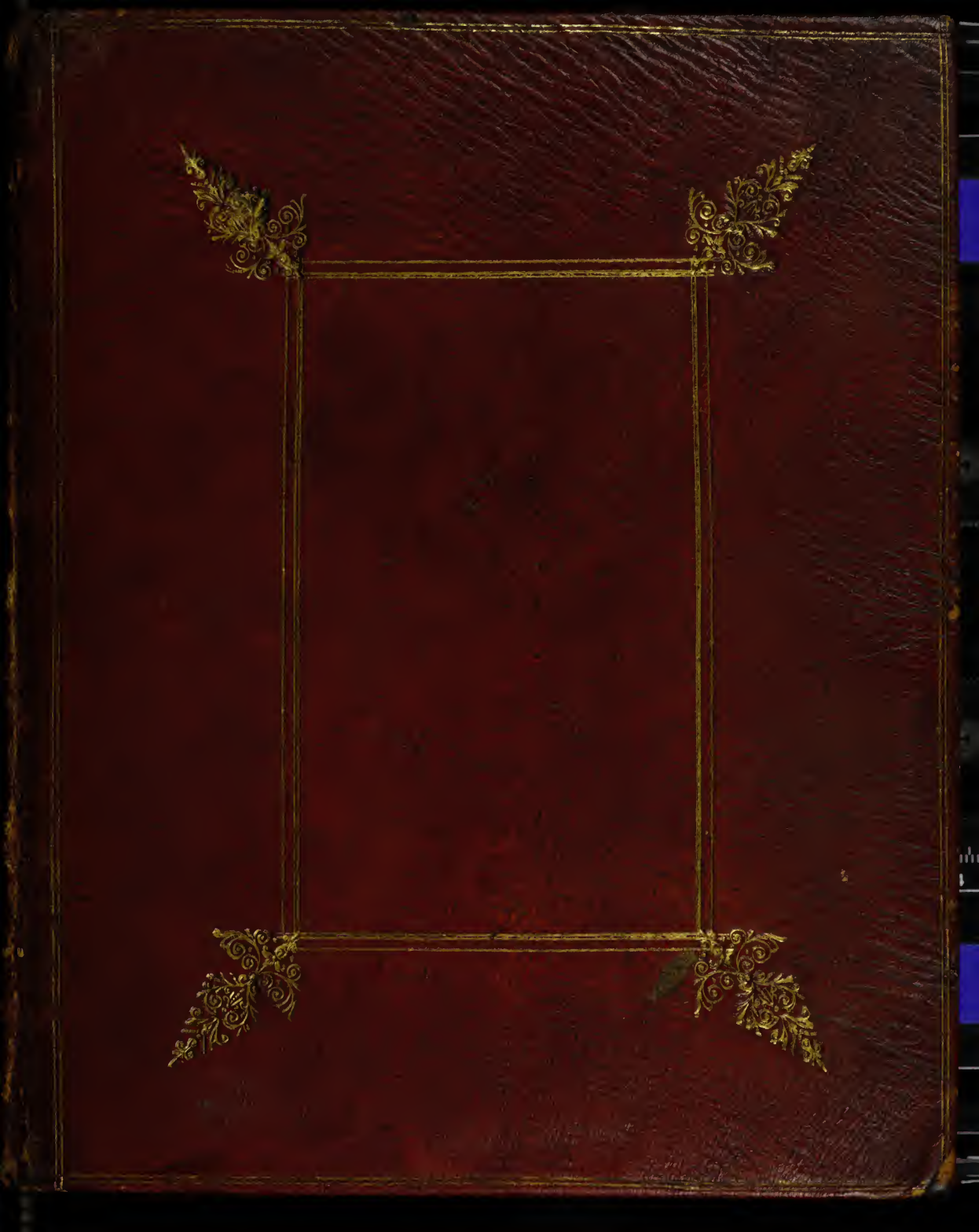

18. Pickering & Chatto '20

of Pickering.

OF THE
VSEFVLNESSE
OF
Experimental Philosophy.

THE HON. ROBERT BOYLE

ROBERTVS BOYLE NOBILIS ANGLVS

SOME
CONSIDERATIONS
touching the
VSEFVLNESSE
Of EXPERIMENTAL
Naturall Philosophy,

Propos'd in Familiar Discourses to a Friend, by way of *Invitation* to the Study of it.

OXFORD
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The PVBLISHER to the Reader.

IT is, Courteous Reader, part of the Satyr of *Petronius* againſt the Vice of his own Time. *Priſcis temporibus, cum adhuc nuda Virtus placeret, vigebant Artes ingenuæ, ſummumque certamen inter homines erat, ne quid profuturum ſæculis diu lateret. Democritus omnium Herbarum ſuccos expreſſit, & ne lapidum virgultorumque vis lateret, ætatem inter Experimenta conſumpſit.* Other Examples of the like Induſtry he brings, and then concludes againſt the Lazineſs and Luxury of his own Age. *At Nos*, ſaith He, *ne paratas quidem Artes audemus cognoſcere, ſed accuſatores Antiquitatis vitia tantum docemus & diſcimus.* It was for want of a *Democritus* or two that he caſts this hard Cenſure upon his own Time. For, not-

withstanding all his Harangue in Commendation of some Ages which were antient to his Own, It is evident out of History, that there was never at once any great Number, who seriously and in earnest for the Benefit of Mankind applyed themselves to these severe Scrutinyes of Natural Bodyes. It is true that now and then, in all Centuries from the Beginning of the World, there have appear'd some Persons of a Nature more refin'd, as if indeed (according to that Phancy of the Old Poets) some *Prometheus* had made them either of another Metall, or of another Temper, from the Vulgar, utterly above all Mixture with, or Embasement by the common Fashions of this World; who did make it the End of their Lives, by Severing and Mixing, Making and Marring, and multiplying Variety of Experiments on all Bodies, to discover their hidden Vertues, & so to enlarge the Power & Empire of Man. But these were ever very few and singular. Even in that so much celebrated Time of *Democritus* these Studies were so rare, that his usual Exercise of the Anatomy of Beasts was look'd upon, as that which made the Soundness of his Mind questionable, even as a Spice of Madness in him: and probably much more might the Vulgar of his Age have been amused, had they

they seen him torturing Minerals and Metals in the more toilsome Anatomy of Fire.

Now if it be a dishonourable Crimination to an Age, that it hath brought out no Persons who make it their great Endeavour *Ne quid profuturum sæculis lateat*: and if the Discovery of one or two persons of this Kind be enough to expiate for, and take off the Dishonour of the Proletarian Lazinesse and Luxury of the Rest, I think I may justly esteem that the exhibiting to the World the History of the Studyes of the Honourable Author of this Piece may serve to be the Apology and Defence of our Age against such Censures as that wherewith the newly cited *Satyrist* stained his own Time.

And this was one great Reason that hath made me very forward to promote the Publication of This, and diverse other Writings of the same Noble Author. For were there only Tokens of Endeavour in Them, the proof of This Endeavour (even without Attainment) ought to wipe off all Imputations of this nature. But this Motive (though I do account that by exhibiting this Expiation I do somewhat oblige the Age, whose Honour is thereby defended, yet) was far from being the most great and forcible. For the Excellence of the Works themselves,

selves, even as soon as they fell from the pen of the Author, did long since in all Equity set an *Imprimatur* on them.

Nec sumunt aut ponunt secures
Arbitrio popularis Aurae.

Epicurus, when he was casting up the account of his life, upon the very Day of his Death, mentions a very great pleasure that he even then took in two Parts of his former Studyes: And these were his *Rationes*, and his *Inventa*; *Points well argued*, and *things happily found out*. The two very same particulars are principally conspicuous in this ensuing Piece. There are good Conclusions against the Enemies of the Being and Providence of God in the First Part, and in the Second there be Notices of divers *Inventa* profitable to the Use of Man. By the one sound Notions are proposed to the Readers apprehension from the Contemplation of God's Creation and Government of the World, and thereby good Matter is suggested to his Affections for the Advancement of his Devotion; by the Other, there are divers things deliver'd, which may tend to enlarge Man's power of doing Good: By them, in the whole, both our Honour to God, and our Charity to our Neighbors may

may be assisted: in which two the Substantial part of all the most Noble, not only Human but Christian Vertues, both Speculative and Practical, are certainly contained.

I must not omit, that an Argument of this Nature, at this Time, may justly be commended for its Seasonableness, when divers Persons, who know not the way of *Experimental Philosophy*, and are loath now to give themselves the trouble of learning it, have been making some attempts, very unthankfully, to traduce both It, and its Promoters.

These Considerations passed with me for Reasons, and had upon me this force and Prevalence, that as soon as I had the Authors leave, I durst not forbear the committing of them to the Press, notwithstanding his Many arguments, which were plausible enough to the Contrary: as, namely, that much of the *First Part* was written when he was of so immature Years, that should I be particular concerning his Age then, to any person who hath read the Piece, the Paucity of such Instances might justly make me dispair of begetting Credit to my Relation. Another Objection was, That, though his Method did of necessity lead him to it, yet it might be look'd upon as unbecomming for Him to

meddle with the Physitians Art, of which he never did (nor could, by reason of his Native Honour) make any Profession. But these Oppositions being raised upon points of Curiosity in Ceremony and outward *Decorum*, were of little weight, when the forementioned Noble Offices of Charity and doing good were in the other Scale.

The greater Question was. Suppose them to be publisht, But why now? Why so soon? Should not rather the Edition have been delay'd, untill it might have come out together with *The second Section of the second Part?* (which discovers the Use that may be made of Experimental Learning, to advance the Empire of Man over other Creatures) or untill the Common Preface, and some other little Tracts, all written long since, and intended to accompany this, might be revised by the Author; or at least untill the Author might have had leisure to have made some more new & full Animadversions to the Receipts & Processes contain'd in the Appendix? The Consideration which answer'd this Objection was, That this Piece, as now printed alone, would make (as you see it doth) a very competent Book, which would have by it Self the perfection, if not of the Whole yet of a more principal part; and of that part, which to

Professors

Professors or Candidates of Learning is most desireable. And then the Author's Avocations and other Studies being so many, that we could prefix no certain time for the complement of the mention'd remaining parts, I was loath to hazard the Preservation of These by deferring the Impression; since I know there is no Security of the continuance of those Writings which are reposed only in single, or at most in few written Copies. I remember, the Author had once lost for a good while one of these very Essays which are now here Printed, and put beyond that Danger for the future. Besides other Casual accidents, the very Contingency of Humane life, and the chance of a Man's papers after Death, (For to them the Question of King *Solomon* is most proper and pertinent, *Who knows whether then they may happen to fall into the hands of a Wise man or a Fool?*) were of force enough to perswade me to secure these, when it was in my power, unto the Common Use. Would not Printing in all probability have preserv'd unto Us that Universal History of Vegetables from the Cedar of *Libanus* unto the Mos that groweth upon the Wall, written by that Wise and Learned King, and the loss of which we now in vain lament? Would not Printing have sav'd that Excellent Book

of *Democritus*, wch he inscribed his ΧΕΙΡΟΚΜΗΤΑ or EXPERIMENTS *of his own personal Tryal*, so utterly lost, that the Name of the piece is not mention'd among the Catalogue of his Writings in *Laertius*? And may not the Printing of this Piece be a meanes of the preservation (besides the Notional part) of divers very useful ΧΕΙΡΟΚΜΗΤΑ of the Honourable Author, who hath been ever unwearied in the Tryal of all probable Experiments, that may increase the Light or advance the Profit of Mankind?

But before I leave the Reader, I must give him this single Advertisement, that the Passages included within the *Paratheses* or *Crotchetts*, as the Press stiles them, that is, between any two such Marks as these [ ] were inserted long since the writing of these Essays, upon the Relection of some parts of the Book before He sent it to me: Which I therefore did so distinguish, and do intimate, that there may appear no inconsistency in our Author, and the Reader may not marvel to find somethings very Recent in a Book written several Years agoe. Farewell.

RO: SHARROCK.

The Author's ADVERTISEMENT *about the following* ESSAYS.

THat the Title of the following Treatise might not raise in the Reader an Expectation of more then he will find in the Book, I think my self oblig'd to inform him, That, though it come not forth before, divers parts were sent to the Press in 1660, or 1661, and this present Year 1663, yet the very Last Essay of it was written divers Years before. Since when those Papers were left, sometimes in the hands of Friends, and sometimes in distant places where I could not come at them: which I mention, that the Reader may neither wonder nor blame Me, if he now meet with some things in them that have already been published by others, or are more vulgarly known then my way of mentioning them implyes. For it may, this notwithstanding, very well be, that when I writ them, no body had yet lighted on some of them, and that others of them did then but begin to be

taken

taken notice of. And as for the Five firſt Eſſays, *which treat of* The Uſefulneſs of Natural Philoſophy to the Mind of Man, *though by my addreſſing them all the way to the Gentleman I call* Pyrophilus, *they may ſeem to have been Originally written to the ſame Perſon, and about the ſame time with the* Eſſays, *that make up the* Second Part; *yet indeed a great Portion of the* Firſt part *was written, as I remember*, 10 *or* 12 *years ago, (when I was ſcarce above* 21 *or* 22 *years old) to another Friend, to whom the Conſiderations that ſerv'd to confirm Piety, and excite Devotion, were far more acceptable then thoſe that were more purely Phyſiologicall: ſo that having, whether through lazineſſe, or want of leiſure contented my ſelf to ſubſtitute the name of* Pyrophilus *for that of my other Friend (who was not unwilling I ſhould do ſo) in a Diſcourſe written when I was ſo Young; I would not have the Reader think, that I do now ſo approve of all thoſe Youthful Diſcourſes (which I therefore ſuffer to paſs abroad without a Name) as to think all the Tenets they propoſ'd to be irrefragable Truths, or all the Reaſonings they contein, to be Demonſtrative; & that I would at preſent have my Judgment eſtimated according to their Cogency. But yet I do without much Reluctancy comply with thoſe Friends, who would by no means conſent, that the Five firſt Eſſays of this Treatiſe ſhould not come forth with the Reſt; partly becauſe not*

writing

writing all things for all Readers, I hold it not unfit to publish something to gratify those, who desire with me to be both excited and assisted to admire and praise the Great and Wise Author of all things; partly because the Treatise would seem maim'd and incompleat, if the latter Essays should come abroad without the Rest; and partly too because Learned Men have been pleas'd to assure me, that those Essays are not destitute of Notions and Ratiocinations, that are not altogether vulgar or contemptible. However those Readers, that either cannot relish, or at least desire not any thing, but what is meerly Physiologicall, may, thus advertis'd, passe by the former part of this Treatise, and content themselves to read over the Latter, though they who shall take the Pains to read Both, will not perhaps think their Labour lost: Since I have taken Care to leave even the former Part as little disfurnisht with Experiments and useful Notions, as, the Argument consider'd, I conveniently could. And since also for the Paucity of such things in the First Part, I have endeavoured to make amends in the Second, which is almost wholly Physiological; concerning which nevertheless I shall admonish the Reader. And indeed the whole Tenets that make up the following Book, are by no means to be look'd upon as Published for an acurate Treatise of the Usefulnes of true Physiology, but as Familiar Writings, that want only the formality of

Salve

Salve *and* Vale *to passe for Physiological and Medical* Epistles; *consisting of such loose Observations, as I thought might be this way preserv'd, and did not so properly belong to my other Writings as they seem'd fitted for the use, and whereto I have applyed them; namely, that being drawn up together into one Treatise, their Union might enable them to make the greater Impression, and might (somewhat at least) recommend that sort of Learning to a Beginner. And one thing that must be especially comprehended in this Admonition is, that the Particulars I have mentioned, to shew of what use Chymical Experiments may be to a Physitian, are not, possibly, the chiefest that even I could set down, if I were not restrained by some justifiable Considerations; especially 'till I see what Entertainment, the things I now venture abroad, will meet with there: Some of those I reserve, appearing such to me, that I confesse I do not slight them enough to be fond of obtruding them upon the Publick, if I thought they would not be welcome to it. And I do so little desire to have, what I have written, look'd upon as the most that can be said, to shew the Usefulness of* Experimental Philosophy, *that I scruple not to acknowledg there are things which incline me to suspect, that some in the world, though not particularly known to me, may have* Arcana, *to which most of the Processes I reserve, as well as all that is commonly known in Chymistry, may prove little more then Trifles.*

Mr. BOYLE
Of Experimentall Philosophie.

OF THE VSEFVLNESSE OF Naturall Philoſophy.

The Firſt Part.

Of its Vſefulneſs in reference to *the Minde of Man.*

ESSAY I.

Of the USEFULNESSE of EXPERIMENTALL PHILOSOPHY, Principally as it Relates to the *MIND* of *MAN*.

THE NATURAL PHILOSOPHY wont to be taught in moſt Schools, being little other then a Syſteme of the Opinions of *Ariſtotle*, and ſome few other Writers, is not, I confeſſe, *Pyrophilus*, very difficult to be Learned; as being attainable by the peruſall of a few of the more *Current* Authors. But, *Pyrophilus*, that EXPERIMENTAL PHILOSOPHY, which you will find Treated of in the following Eſſayes, is a Study, if duely proſecuted, ſo difficult, ſo chargable, and ſo toilſome, that I think it requiſite, before I propoſe any particular Subjects to your Enquiries, to poſſeſſe you with a juſt value of true and ſolid Phyſiologie; and to convince you, That by endevouring to addict you to it, I invite you not to miſpend your time or trouble on a Science unable to merit and requite it. In order, *Pyrophilus*, to the giving you this ſatisfaction, Give me leave to mind you, that it was a ſaying of *Pythagoras*, worthy

worthy so celebrated a Philosopher, That there are two things which most *ennoble* Man, and make him resemble the Gods; *To know the Truth, and To do Good.* For, *Pyrophilus*, that Diviner part of Man, the Soule, which alone is capable of wearing the Glorious Image of its Author, being endowed with two chief Faculties, the Understanding and the Will; the former is blest and perfectionated by Knowledg, and the latter's Lovelieſt and most improving property is Goodnesse. A due Reflection upon this excellent Sentence of him to whom Philosopers owe that modest name, should, me thinks, *Pyrophilus*, very much endear to us the Study of Naturall Philosophy. For there is no Humane Science that does more gratifie and enrich the Understanding with variety of choice and acceptable Truths; nor scarce any that does more enable a willing mind to exercise a Goodnesse beneficiall to others.

To manifest these truths more distinctly, *Pyrophilus*, and yet without exceeding that Brevity my Avocations and the bounds of an Essay exact of me, I shall, among the numerous advantages accruing to Men from the Study of the Book of Nature, content my selfe to instance only in a Couple, that relate more properly to the *Improving of Mens Understandings*, and to mention a few of those many, by which it *encreases their Power.*

The two chiefe advantages which a reall acquaintance with Nature brings to our Minds, are, First, by instructing our Understandings and gratifying our Curiosities; and next, by exciting and cherishing our Devotion.

And for the first of these, since, as *Aristotle* teacheth, and was taught himself by Common Experience, *all Men are Naturally desirous to Know:* that Propensity cannot but be powerfully engaged to the Works of Nature, which being incessantly present to our senses, do continually sollicite our Curiosities: Of whose potent inclining us to the Contemplation of Natures Wonders, it is not perhaps the inconsiderablest Instance, That though the Naturall Philosophy hitherto taught in most Schools,

Schools, hath been so Litigious in its Theorie, and so barren as to its Productions; yet it hath found numbers of Zealous and Learned Cultivators, whom sure nothing but Mens inbred fondnesse for the Object it converses with, and the end it pretends to, could so passionately devote to it.

And since that (as the same *Aristotle* taught by his Master *Plato* well observes) Admiration is the Parent of Philosophy, by engaging us to enquire into the Causes of the things at which we marvail; we cannot but be powerfully invited to the Contemplation of Nature, by living and conversing among Wonders, some of which are obvious and conspicuous enough to amaze even ordinary Beholders; and others admirable and abstruse enough to astonish the most inquisitive Spectators.

The bare prospect of this magnificent Fabrick of the Universe, furnished and adorned with such strange variety of curious and usefull Creatures, would, suffice to transport us both with Wonder and Joy, if their Commonnesse did not hinder their Operations. Of which Truth Mr *Stepkins*, the famous Oculist, did not long since supply us with a memorable Instance: For (as both himselfe and an Illustrious Person that was present at the Cure informed me) a Maid of about Eighteen yeares of Age, having by a couple of Cataracts, that she brought with her into the World, lived absolutely blind from the moment of her Birth; being brought to the free Use of her Eyes, was so ravisht at the surprizing spectacle of so many and various Objects, as presented themselves to her unacquainted Sight, that almost every thing she saw transported her with such admiration and delight, that she was in danger to loose the eyes of her Mind by those of her Body, and expound that Mysticall Arabian Proverb, which advises, *To shut the Windowes, that the House may be Light.*

But if the bare beholding of this admirable Structure is capable of pleasing men so highly, how much satisfaction, *Py-*

rophilus, may it be supposed to afford to an Intelligent Spectator, who is able both to understand and to relish the admirable Architecture and skilfull contrivance of it: For the Book of Nature is to an ordinary Gazer, and a Naturalist, like a rare Book of Hieroglyphicks to a Child, and a Philosopher: the one is sufficiently pleas'd with the Oddnesse and Variety of the Curious Pictures that adorne it; whereas the other is not only delighted with those outward objects that gratifie his sense, but receives a much higher satisfaction in admiring the knowledg of the Author, and in finding out and inriching himselfe with those abstruse and vailed Truths dexterously hinted in them.

Yes, *Pyrophilus*, as the Understanding is the highest faculty in Man, so its Pleasures are the highest he can naturally receive. And therefore I cannot much wonder that the famous *Archimedes* lighting in a Bath upon an Expedient to resolve a perplexing difficultie in Naturall Philosophy, should leap out of the Bath, and run unclothed like a madman, crying nothing but Εὕρηκα, Εὕρηκα, *I have found it, I have found it.* Nor do I so much admire as deplore the fatally venturous Curiosity of the Elder *Pliny*, who, as the Younger relates, could not be deterr'd by the formidablenesse of the destructive flames vomited by *Vesuvius*, from indevoring by their Light to read the Nature of such Vulcanian Hils; but in spight of all the dissuasions of his Friends, and the affrighting eruptions of that hideous Place, he resolved that Flaming Wonder should rather kill him, then escape him; and thereupon approch'd so neer that he lost his Life to satisfie his Curiosity, and fell (if I may so speak) a Martyr to Physiologie. For we daily see Alchymists hazard their Lives on Minerall Experiments in Furnaces, where though the fires are not so vast and fierce, as those that *Pliny* went to consider; yet the (dangerous when not pernicious) Fumes do sometimes prove as fatall.

One

One would think, *Pyrophilus*, that the converſing with dead and ſtinking Carkaſes (that are not onely hideous objects in themſelves, but made more ghaſtly by the puting us in mind that our ſelves muſt be ſuch) ſhould be not onely a very melancholy, but a very hated imployment. And yet, *Pyrophilus*, there are Anatomiſts who dote upon it; and I confeſs its Inſtructiveneſs has not onely ſo reconciled me to it, but ſo enamor'd me of it, that I have often ſpent hours much leſs delightfully, not onely in Courts, but even in Libraries, then in tracing in thoſe forſaken Manſions, the inimitable Workmanſhip of the Omniſcient Architect.

The curious Works of famous Artificers, are wont to invite the Viſits, and excite the wonder of the generality of inquiſitive Perſons. And I remember, that in my Travels, I have often taken no ſmall pains to obtain the pleaſure of gazing upon ſome Maſterpiece of Art: But now, I confeſs, I could with more delight look upon a skilful Diſſection, then the famous Clock at *Strasburg*. And, methinks, *Ariſtotle* diſcourſes very Philoſophically in that place, where paſſing from the conſideration of the ſublimiſt productions of Nature, to juſtifie his diligence in recording the more homely Circumſtances of the Hiſtory of Animals, he thus diſcourſes: *Reſtat* (ſaith he) *ut de animanti natura diſſeramus, nihil pro viribus omittentes vel vilius vel nobilius. Nam & in iis quæ hoc in genere minùs grata noſtro occurrunt ſenſui, Natura parens & author omniũ miras excitat voluptates hominibus, qui intelligunt cauſas & ingenuè Philoſophantur. Abſurdum enim nulla ratione probandum eſt, ſi imagines quidem rerum naturalium non ſine delectatione propterea inſpectamus, quòd ingenium contemplamur quod illas condiderit, id eſt, artem pingendi aut fingendi; rerum autem ipſarum naturæ ingenio miráque ſolertia conſtitutam contemplationem non magis proſequamur atque exoſculemur, modo cauſas perſpicere valeamus: It remains* (ſaith he) *that we diſcourſe of the natures of Animals, being circumſpect*

Ariſt: de Part: Anim: lib. 1. c. 5.

to omit none, either of the nobler or inferior sort: For even from those Creatures which less please our sense, does the universal Parent, Nature, afford incredible contentments to such Persons, as understand their causes, and Philophize ingenuously. Since it were absurd and inconsistent to reason, if we should behold the Portraitures of Natural things with delectation, because we observe the accuratness wherewith they are designed, namely, the skil of Painture or Sculpture; and not much more affect and pursue the contemplation of things themselves, contrived by the exquisite Artifice and Sagacity of Nature; provided we be able to understand their causes. And the better to make out to you, *Pyrophilus*, the delightfulness of the study of Natural Philosophy, let me observe to you, That those pleasing Truths it teacheth us, do highly gratifie our intellectual Faculties, without displeasing any of them: for they are none of those Criminal Pleasures, which injur'd and incensed Conscience does very much allay, even in the Fruition, and turns into Torments after it. Nor are the Enquiries I am recommending of that trifling and unserviceable sort of Imployments, which though Conscience condemns not as unlawful for a Christian, Reason disapproves as not worthy of a Philosopher; and wherewith to be much delighted, argues a weakness; as to be pleased with Babies and Whistles, supposes unripe and weak Intellectuals: But the contemplation of Nature, is an Imployment; which both the Possessors of the sublimest Reason, and those of the severest Virtue, have not onely allowed, but cultivated. The Learned Author of the Book *De Mundo*, ascrib'd to *Aristotle*, begins it with this *Elogium* of Natural Philosophy: *Mihi quidem sæpe* (says he) *divina quædam res, Alexander, admirationeq; digna visa est Philosophia; præcipuè vero in ea parte in qua sola ipsa sublimè sese tollens ad contemplandas rerum naturas, magno illic studio contendit existentem in eis veritatem pernoscere.* *Philosophy* (saith he) *O* Alexander, *hath oftentimes seem'd to me a Divine and Admirable Thing; but chiefly*

chiefly, that part of it, which aspires to contemplate the Natures of things, imploying its utmost power in searching out the truth containcd in them. The reasonableness of which Commendation, he handsomly enough prosecutes in the subsequent Discourse: To which I shall refer you, that I may proceed to minde you, that *Pythagoras*, *Democritus*, *Plato*, and divers others of those whose Wisdom made after-ages reverence Antiquity, did not onely esteem the Truths of Nature worth studying for, but thought them too worth Travelling for as far as those Eastern Regions, whose Wise-men were then cry'd up for the best Expositors of the obscure Book of Nature: And that severe Teacher, and perswasive Recommender of the strictest Virtue, *Seneca* (whose eminent Wisdom made him invited to govern Him that was to govern the World, and who so often and so excellently presses the husbanding of our time) does not onely in several Passages of his Writings praise a contemplation of Nature, but Writes himself seven Books of Natural Questions, and addresses them to that very *Lucilius*, whom in his Epistles he takes such pains to make compleatly Virtuous; and in his Preface, after he had said according to his manner, loftily, *Equidem tunc Naturæ rerum gratias ago, cum illam non ab hac parte video, quæ publica est, sed cum secretiora ejus intravi, cum disco quæ Universi Materia sit, quis Author, aut Custos*, &c. *Then do I pay my acknowledgements to Nature, when I behold her not on the out-side, which is obvious to publick view, but am enter'd into her more secret Recesses; when I understand what the Matter of the Universe is, who its Author, and Preserver*, &c. He concludes in the same strain, *Nisi ad hæc admitterer, non fuerat operæ pretium nasci: Had I been debarr'd from these things, it would not have been worth coming into the World.* And to adde what he excellently says in another Treatise, *Ad hæc quærenda natus* (says he, having spoken of Enquiries concerning the Universe) *æstima quàm non multùm acceperit temporis, etiam si illud totum sibi vindicet, cùlicet*

Seneca in Præf. lib. I. Nat: Quæst.

licet nihil facilitate eripi, nihil negligentia patiatur excidere; licet horas suas avarissimè servet, & usque in ultimæ ætatis humanæ terminos procedat, nec quicquid illi ex eo quod Natura constituit fortuna concutiat; tamen homo ad immortalium cognitionem nimis mortalis est. Ergo secundum Naturam vivo, si totum me illi dedi, si illius Admirator Cultorq; sum. Natura autem utrumq; facere me voluit & agere, & contemplationi vacare: Sen: de Otio Sap: c. 32. *Being born designedly for searching out these things, consider that the portion of time allotted to Man, is not great, if this study should ingross it all; since though he should preserve his hours with the greatest frugality all his life-time, not suffering any to be stolen from him, or slide away negligently, and never be disturbed by Accidents of Fortune in the Imployment Nature has appointed him, yet is he too Mortal to attain the knowledge of Immortal Things. Wherefore, I live agreeably to Nature, when I give up my self wholly to Her, and am Her Admirer and Adorer. Moreover, Nature hath designed me to act, and imploy my self in Contemplation.* How far Religion is from dis-approving the Study of Physiology, I shall have occasion to manifest ere long, when we shall come to shew, That it is an act of Piety to offer up for the Creatures the Sacrifice of Praise to the Creator; For, as anciently among the Jews, by virtue of an Aaronical Extraction, Men were born with a Right to Priesthood; so Reason is a Natural Dignity, and Knowledge a Prerogative, that can confer a Priesthood without Unction or Imposition of Hands. And as for Reason, that is so far from making us judge that Imployment unworthy of Rational Creatures, that those Philosophers (as *Aristotle, Epicurus, Democritus*, &c.) that have improv'd Reason to the greatest height, have the most seriously and industriously imploy'd it to investigate the Truths, and promote the study of Natural Philosophy.

And indeed, that noble Faculty call'd Reason, being conscious of the great progress it may enable us to make in the knowledge

knowledge of Natures Myſteries, if it were induſtriouſly imploy'd in the ſtudy of them, cannot, but like a great Commander, think it ſelf diſobliged by not being conſiderably employ'd. And certainly we are wanting to our ſelves, and are guilty of little leſs then our own Degradation, that being by Gods peculiar vouchſafement, endowed with thoſe noble Faculties of Underſtanding, and Diſcourſing, and plac'd amidſt a numberleſs variety of Objects, that inceſſantly invite our Contemplations, can content our ſelves to behold ſo many Inſtructive Creatures which make up this vaſt Univerſe, whoſe nobleſt Part we are deſign'd to be, with no more, or but little more diſcerning Eyes then thoſe leſs favored Animals, to whom Nature hath denyed the Prerogative of Reaſon, as we deny our ſelves the uſe of it. *Ariſtotle* well obſerves, that among Animals, Man alone is of an erected Stature; and adds, That it is becauſe his Nature hath ſomething in it of Divine: *Officium autem Divini* (infers he) *eſt intelligere atque Sapere: The Qualifications of a Divine Being, are Underſtanding and Wiſdom.* And it cannot but miſ-become the dignity of ſuch a Creature to live Ignorant or Unſtudious of the Laws and Conſtitutions of that great Commonwealth (as divers of the Antients have not improperly ſtiled the World) whereof he is the eminenteſt part: And were we not lulled aſleep by Cuſtom or Senſuality, it could not but Trouble, as well as it Injures a reaſonable Soul to Ignore the Structure and Contrivance of that admirably Organiz'd Body in which ſhe lives, and to whoſe intervention ſhe owes the Knowledge ſhe hath of other Creatures.

De Part. Anim. lib. 4. c. 10.

'Tis true indeed, that even the generality of Men, without making it their deſign, know ſomewhat more of the Works of Nature, then Creatures deſtitute of Reaſon can, by the advantage of that Superior Faculty, which cannot but even unurg'd, and of its own accord make ſome, though but ſlight, reflections on the Information of the Senſes: But if thoſe Impreſſions be onely receiv'd and not improv'd, but rather neg-

lected; and if we (contenting our selves with the superficial account given us of things by their obvious Appearances and Qualities) are beholding for that we know, to our Nature, not our Industry, we faultily loose both one of the noblest Imployments, and one of the highest Satisfactions of our rational Faculty: And he that is this way wanting to himself, seems to live in this magnificent Structure, call'd the Universe, not unlike a Spider in a Palace; who taking notice onely of those Objects that obtrude themselves upon her Senses, lives ignorant of all the other Rooms of the House, save that wherein she lurks, and discerning nothing either of the Architecture of the stately Building, or of the Proportion of the Parts of it in relation to each other, and to the intire Structure, makes it her whole business, by intrapping of Flies to continue an useless Life; or exercise her self to spin Cob-webs, which though consisting of very subtle Threds, are unserviceable for any other then her own trifling uses. And that the contemplation of the World, especially the higher Region of it, was design'd for Mans Imployment by Natures Self, even the Heathen Poet (perhaps instructed by *Aristotle*) could observe, who Sings,

Pronaq; cum spectent Animalia cætera terram,
Os homini sublime dedit, cœlumq; tueri
Jussit, & erectos ad sidera tollere vultus.

Wise Nature, framing Brutes with downward looks,
Man with a lofty Aspect did indue,
And bad him Heaven with its bright Glories view.

I might annex, *Pyrophilus*, the Story *Josephus* tells us in the beginning of his *Jewish Antiquities*, that 'twas the holy *Seth* and his Posterity (who are in *Genesis* stil'd the Sons of God) that were the Inventers of Astronomy, whose more Fundamental Observations (to perpetuate them to Man-kinde, and

sever

ſever them from the foretold deſtructions by Fire and Water) they engraved upon two Pillars, the one of Brick, the other of Stone; the latter of which our Hiſtorian reports to have been extant in *Syria* in his time. And it is an almoſt uncontroll'd tradition, that the Patriarch, whom God vouchſafes to ſtile *his Friend*, was the firſt Teacher of Aſtronomy and Philoſophy to the *Egyptians*, from whom, long afterwards, the *Grecians* learn'd them. *Beroſus* himſelf records him to have been skill'd in the Science of the Stars, as he is cited by *Joſephus*, (*Ant. lib.* 1. *c.* 8.) who a little after ſpeaking of *Abraham* and the *Egyptians*, expreſly affirms, that *Numerorum ſcientiam & ſiderum benignè illis communicavit: Nam ante Abrahami ad ſe adventum, Ægyptii rudes erant hujuſmodi diſciplinarum; quæ à Chaldæis ad Ægyptios profectæ, hinc ad Græcos tandem pervenerunt.* Iſaiah 41. 8. James 11. 23.

But, *Pyrophilus*, to put it out of queſtion that the ſublimeſt reaſon needs not make the Poſſeſſor of it think the ſtudie of Phyſiologie an Imployment below him, that Unequall'd *Solomon*, who was pronounced the Wiſeſt of men by their omniſcient Author, did not onely Juſtifie the Study of Naturall Philoſophy by addicting himſelfe to it, but ennobled it by teaching it, and purpoſely compoſing of it thoſe matchleſſe Records of Nature, from which I remember ſome Jewiſh Authors relate *Ariſtotle* to have borrowed diverſe; which (if it be true) may well be ſuppoſed to be the choiceſt pieces that adorn'd his Philoſophie, and which Providence perhaps depriv'd the World of, upon ſuch a ſcore as it did the Jewes of the Body of *Moſes*, leſt men ſhould Idolize it; or as ſome Rabbies are pleaſed to informe us, leſt vicious men ſhould venture upon all kinds of Intemperance, out of Confidence of finding out by the help of thoſe excellent Writings the Cure of all the Diſtempers their diſſoluteneſſe ſhould produce.

And, *Pyrophilus*, yet a little further to diſcover to you, the Delightfulneſſe of the Contemplations of Natures works, Give me leave to mind you of their almoſt unimaginable Va-

riety, as of a Propertie, that ſhould methinks not faintly recommend Naturall Philoſophy, to curious and active Intellectuals.

For moſt other Sciences, at leaſt as they are wont to be taught, are ſo narrow and ſo circumſcrib'd, that he who has read one of the beſt and recenteſt Syſtems of them, ſhall find little in the other Books publiſht on thoſe ſubjects, but diſguis'd repetitions; and a diligent Scholar may in no long time learn as much as the Profeſſors themſelves can teach him. But the objects of Naturall Philoſophy, being as many as the Laws and Works of Nature are, ſo various and ſo numberleſſe, that if a Man had the Age of *Methuſelah* to ſpend, he might ſooner want time then matter, for his Contemplations: And ſo pregnant is each of that vaſt multitude of Creatures, that make up the Naturaliſts Theme, with uſefull matter to employ Mens ſtudie, that I dare ſay, that the whole life of a Philoſopher ſpent in that alone, would be too ſhort to give a full and perfect account of the Natural Properties and Uſes of any one of ſeveral Minerals, Plants, or Animals, that I could name. 'Tis an almoſt incredible variety of Vegetables, that the teeming Earth, impregnated by Gods *Producat Terra*, does in ſeveral Regions produce. Botaniſts have a pretty while ſince, reckon'd up near 6000 Subjects of the Vegetable Kingdom; ſince when, divers other not-deſcribed Plants have been obſerved by Herbariſts; the chief of which will, I hope, be ſhortly communicated to the World, by that Curious and Diligent Botaniſt my Induſtrious Acquaintance, Dr. *How*, to whom I not long ſince preſented a peculiar and excellent kinde of Pepper, whoſe Shell taſtes not unlike Cinnamon, and ſmells ſo like Cloves, that with the Odor I have deceived many, which he confeſt to be new even to him; it having been lately gathered in *Jamaica* (where it abounds) and preſented me by the inquiſitive Commander of the Engliſh Forces there. And yet, *Pyrophilus*, this great variety of Simples could not deter either Ancient or Modern Inquirers from Writing

Writing entire Treatises of some particular Ones. So *Pliny* tells us, [a] That *Themison* the Physitian publisht a Volume (for so he call'd it) of that vulgar and despised Herb called *Plantain*: So the same [b] Author tells us, That *Amphilochus* writ a Volume *De Medica Herba, & Cytisa*; and King [c] *Juba* another, of a sort of *Nymphæa* by him found on Mount *Atlas*. And in our Times, not to mention those many Books that have been written by Physitians, Of the Structure of Mans Body, and *De Usu Partium*: *Carolus Rosenbergius* writ some Years since an entire Book of Roses, which he calls his *Rhodologia*: *Martinus Blochwitius* since publisht another Book of Elder, under the Title of *Anatomia Sambuci*. Among the Chymists, *Angelus Sala* publisht in distinct Treatises, his *Vitriologia*, *Tartarologia*, *Saccharologia*: *Untzerus* also writ peculiar Tracts, *De Mercurio*, *De Sulphure*, *De Sale*. And *Paracelsus* himself vouchsafed distinct Treatises to *Hypericon*, *Persicaria*, *Helleborus*, and some other particular Plants. *Basilius Valentinus* (one of the most Knowing and Candid Chymical Writers) publisht long since an excellent Treatise of *Antimony*, inscrib'd *Currus Triumphalis Antimonii*; but though in his other he hath also taught us divers other things concerning it, yet he left so much undiscovered in *Antimony*, that *Angelus Sala* was thereby emboldned to publish his *Anatomia Antimonii*. And *Hamerus Poppius* (if that be his true name) *Johannis Tholdius*, and the experienced *Alexander van Suchten*, thought fit to write entire Treatises of that same Mineral; by which if they seem to Eclipse the diligence of *Basilius*, at least they bore witness to his Judgement: for modestly inviting his Readers to make further enquiries into the Nature and Preparations of that abstruse Mineral, He gives this account of his leaving many things unmention'd, *That the shortness of Life makes it impossible for one man throughly to learn Antimony, in which every day something of new is discovered.* And I remember, that having lately given a Chymist, upon his request, some Directions for drawing, not an imaginary Mercury

a *Plin. lib. 25. cap. 8.*
b *Id. lib. 18. cap. 26.*
c *Id: lib. 25. cap. 7.*

cury of Antimony, as those which are wont to be taught by Chymists, but a real fluid Quick-silver; he some days since brought me about an Ounce of it (which you may command when you please) as the first Fruits of Directions, differing enough from those which I have hitherto met with in Authors. A peculiar way likewise of separating from Antimony, not such a Substance as those which are as improperly as vulgarly call'd Antimonial Sulphurs, but a really combustible Body, which looks and burns so like common Brimstone, that it is not easily distinguishable from it, we shall elsewhere, God willing, *Pyrophilus*, teach you. And I remember, that whereas according to the way mentioned by *Basilius* in his *Currus Triumphalis*, and both generally transcrib'd by Authors, and formerly practis'd by our selves, the Tincture of the Glass of Antimony is very tedious to make, being to be drawn with Spirit of Vinegar, I once made a *Menstruum* to draw it more expeditiously, which having not hitherto met with in any of the Authors I have read, I shall not conceal from you: Taking then an arbitrary quantity of the best French Verdegreece, and distilling it orderly in a strong naked Fire, I found the extorted Liquor to extract (even in an ordinary digesting heat) from powdred Antimonial Glass, a Blood-red Tincture in three or four hours; and my curiosity leading me to abstract the *Menstruum* from the tinging Powder, and put it again upon pulverisd Glass, I found it again highly Tincted in a very few hours. And prosecuting the Experiment, I found that by drawing off the *Menstruum*, and digesting Spirit of Wine upon the remaining Calx, I could soon obtain a red Tincture, or Solution, From which some Chymists, if I should tell them what I have now told you, would perhaps expect no ordinary Medicine. But this, I suppose, you will think less strange, then that with a Liquor easily separated, by a way which I may elsewhere teach you, from an obvious Vegetable, of which you may safely eat a whole Pound at a time, I have drawn a deep red Tincture, even from crude Antimony, and that in not many hours, and without heat.

And

And to these Experiments of Antimony, I might (partly from the communication of my Friends, and partly from some tryals of my own) adde divers other undivulg'd Experiments relating to that Mineral; if it were not now more seasonable, reserving them for other Papers, to minde you, That the Learned *Kircherus* hath inrich'd us with a great Volume *in Folio*, of Light and Shadows; and another *in Quarto*, of the Load stone: and yet none of these have so exhausted the Subjects they have treated of, but that an after-Enquirer may be able to recruit their Observations with many new ones, perhaps more numerous or more considerable then the former: As after our Learned Country-man *Gilbertus* had written a Volume of the Load-stone, the Jesuit *Cabeus* was not by that deterr'd from writing another of the same Subject: And though since *Cabeus*, the Ingenious *Kircherus* have so largely prosecuted it in his Voluminous *Ars Magnetica*, yet he has not reap'd his Field so clean, but that a careful Gleaner may still finde Ears enough to make some Sheaves. And what I have lately try'd or seen, makes me think it very possible to recruit those many of *Kircherus*, with some further Magnetical Experiments unmention'd in his Book. And I have, the very day I writ this, made in that admirable Stone a not-inconsiderable Experiment, not extant (that I remember) there: For taking an oblong Load-stone, and heating it red-hot, I found the attractive Facultie in not many minutes, either altogether aboliſh'd, or at least so impaired and weakned, that I was scarce, if at all, able to discern it. But this hath been observed, though not so faithfully related, by more then one; wherefore I shall adde, That by refrigerating this red-hot Load-stone either North or South, I found that I could give its Extreams a Polarity (if I may so speak) which they would readily display upon an excited Needle freely plac'd in *Æquilibrium*: And not onely so, but I could by refrigerating the same end sometime North & sometime South, in a very short time change the Poles of the Load-stone at pleasure, making that which was a quarter of

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an hour before the North-pole, become the South; and on the contrary, the formerly Southern Pole become the Northern: And this change was wrought on the Load-ſtone, not onely by cooling it directly North and South, but by cooling it perpendicularly; that end of it which was contiguous to the Ground, growing the Northern Pole, and ſo (according to the Laws Magnetical) drawing to it the South end of the Needle; and that which was remoteſt from it, the contrary one: As if indeed the Terreſtrial Globe, were, as ſome Magnetick Philoſophers have ſuppoſ'd it, but a Great *Magnes*, ſince its Effluviums are able, in ſome Caſes, to impart a Magnetick Faculty to the Load-ſtone it ſelf. Some other Experiments of this nature, not extant in *Kircherus*, we may have elſewhere fit opportunity to mention. And indeed, that Enigmatical Mineral (if I may ſo call it) the Load-ſtone, is a ſubject ſo fertile in Rarities, that I hear, he himſelf is Reprinting that accurate Treatiſe, with new and large Additions.

Nor are the ſmalleſt and moſt deſpicable productions of Nature ſo barren, but that they are capable both to invite our Speculations, and to recompenſe them. *Pliny* in the eleventh Book of his Natural Hiſtory, where he treats of Inſects, is a little after the entrance, tranſported with an unwonted admiration of the Workmanſhip of Nature in them: *Nuſquam alibi* (ſays he) *ſpectatiore Naturæ rerum artificio: In nothing elſwhere* (ſaith he) *is the workmanſhip of Nature more remarkable then in the contexture of theſe little Creatures.* And after a Wonder, not unworthy a Philoſopher, he concludes, *Rerum Natura nuſquam magis quam in minimis tota eſt: Nature in her whole Power is never more wholly ſeen then in her ſmalleſt Works.* To which *Epiphonema* he adds this Sober and Philoſophical Admonition, *Quapropter, quæſo ne hæc legentes, quoniam ex his ſpernunt multa, etiam relata faſtidio damnent, cum in contemplatione Naturæ nihil poſsit videri ſupervacaneum: Wherefore I would requeſt the Peruſers of theſe Diſcourſes, that although*

though the subjects we treat of are contemptible in their eyes, they would not therefore disdain the relations we shall make of them; since nothing ought to seem superfluous in the contemplation of Nature. I remember that it is from the consideration of so despicable a part as the skin of the Sole of the Foot, that *Galen* takes occasion to magnifie the Wisdom of God in those excellent terms that we shall have occasion to mention hereafter. And, as he says rarely well, though some Creatures seem made of much courser Stuff then others, yet even in the vilest the Makers Art Shines through the despicableness of the Matter. For Idiots admire in things the Beauty of their Materials, but Artists that of the Workmanship: To which, after a great deal of Philosophical Discourse, he adds, *Neque oculo nec cerebro deterius est pes constructus, si utraq; pars ad actiones, cujus gratia fuit facta, se habeat optimè; neque cerebrum sine pede se probe haberet, neque pes sine cerebro: Eget enim, opinor, illud vehiculo, hic autem sensu: Nor is the Foot worse contriv'd then the Brain or Eye, provided each part be duly dispos'd for performance of the actions to which it was design'd: Since the Brain could not conveniently want the Foot, nor the Foot the Brain. For, I conceive, that one stands in need of a support for local motion, and the other of a source from whence to derive the faculties of Feeling.* To which we may annex that Judicious reasoning of *Aristotle*, who descending from the Contemplation of the sublimer Works of Nature, to treat of the Parts of Animals, thus endeavors to keep his Readers from thinking that the Object of it must render that Enquiry despicable: *Restat* (says he) *ut de animante Natura differamus*: And having set down those Words which you have not long since read in connection to these, he thus prosecutes his Discourse: *Quamobrem, viliorum animalium disputationem perpensionemque fastidio quod am puerili sprevisse, molesteq; tulisse dignum nequaquam est: Cum nulla res sit Naturæ, in qua non mirandum aliquod habeatur. Et quod Heraclitum ferunt dixisse ad eos, qui cum alloqui eum vellent, quòd fortè in Casa furnaria quadam*

caloris gratia ſedentem vidiſſent, accedere temperarunt, ingredi enim eos fidenter juſſit, Quoniam, inquit, ne huic quidem loco Dii deſunt immortales; Hoc idem in indaganda quoque natura animantium faciendum eſt. Aggredi enim quæque ſine ullo pudore debemus; cum in omnibus Naturæ numen, & honeſtum pulchrúmque inſit Ingenium; Wherefore it is altogether unſeemly to reject with a kind of Childiſh nicetie, or be offended at the Diſcourſe and Speculation of inferior Animals; Since there is nothing in all Nature, but containes in it ſomewhat worthy of Admiration. And as it is recorded of Heraclitus, that ſeeing ſome perſons deſirous to ſpeak with him, refuſe to approach towards him, becauſe they beheld him warming himſelfe in a miſerable Cottage, he bad them come in without ſcruple, ſince here alſo (ſaid he) *are the Immortall Gods preſent: So in like manner ought we to be highly perſwaded of the Dignity of Animals, when we make Enquiries into their Natures. Which we ought in no wiſe to be aſham'd of; ſince the mighty Power and laudable Wiſdome of Nature is conſpicuous in all things.* Nay *Paracelſus* himſelfe, as haughty as he was, was Philoſopher enough not to diſdain to write a Book *De Myſteriis Vermium*; wherein, though according to His manner he have ſet down many extravagances, he is more Candid in the Delivery of ſeverall Remedies (which Experience hath recently taught us to be more effectuall then probable) then in moſt other of his Writings: And in that Treatiſe he juſtly reprehends the Lazineſſe and Pride of thoſe Phyſitians, who not only neglect and ſcorn Enquiries of Nature themſelves: but when the fruits of ſuch Enquiries are preſented them by others, inſtead of a gratefull acceptance, receive them with contempt and deriſion. To which a while after he adds, what is moſt true, *That God hath Created nothing ſo Vile, Deſpicable, Abject, or Filthy in the World, that may not make for the Health and Uſe of Man.* And certainly what ever God himſelfe has been pleaſed to think worthy his Making, its Fellow-creature, Man, ſhould not think unworthy of his Knowing. Nor is it a

diſparagement

disparagement to a Humane Notion, to represent a Creature, which has the Honour to have been framed according to a Divine *Idea:* and therefore the Wisest of Men in His Naturall Historie, scruples not to write as well of abject *Reptil's*, as of *Lions*, *Eagles*, *Elephants*, and other Noble Animals: and did not only Treate of the tall Cedars of *Lebanon*, but that despicable Plant (whatever it be that is designed by the Hebrew *Ezob*) which growes out of the Wall. For my part, If I durst think my Actions fit to be Examples, I should tell you, that I have been so farre from that effeminate squeamishnesse, that one of the *Philosophicall Treatises*, for which I have been gathering Experiments, is of the Nature and Use of Dungs. And though my condition does (God be praised) ennable me to make Experiments by others Hands; Yet have I not been so nice as to decline dissecting *Dogs*, *Wolves*, *Fishes*, and even *Rats* and *Mice*, with my own Hands. Nor when I am in my Laboratory do I scruple with them naked to handle Lute and Charcoale.

I should here, *Pyrophilus*, cease to entertain you with Discourses of the pleasantnes's of Natural Philosophy, but that I remember I have not yet told you, that the Study of Physiologie is not only Delightful, as it teaches us to Know Nature, but also as it teaches us in many Cases to Master and Command her. For the true Naturalist (as we shall see hereafter) does not only Know many things, which other men Ignore, but can Performe many things that other men cannot Doe; being ennabled by his skill not barely to understand several Wonders of Nature, but also partly to imitate, and partly to multiply and improve them. And how Naturally we affect the Exercise of this Power over the Creatures may appear in the Delight Children take to do many things (which we may have occasion to mention elsewhere) that seem to proceed from an Innate Propensity to please themselves in imitating or changing the Productions of Nature.

And sure 'tis a great Honour that the Indulgent Creator

vouchsafes to Naturalists, that though he gives them not the power to produce one Atome of Matter, yet he allowes them the power to introduce so many Formes (which Philosophers teach to be nobler then Matter) and work such changes among the Creatures, that if *Adam* were now alive, and should Survey that great Variety of Man's Productions, that is to be found in the shops of Artificers, the Laboratories of Chymists, and other well-furnished Magazines of Art, he would admire to see what a new world, as it were, or set of Things has been added to the Primitive Creatures by the Industry of His Posterity.

And though it be very true, that Man is but the Minister of Nature, and can but duely apply Agents to Patients (The rest of the Work being done by the applied Bodies themselves) yet by His skill in making those Applications, he is able to performe such things as do not only give him a Power to Master Creatures otherwise much stronger then himselfe; but may ennable one man to do such wonders, as another man shall think he cannot sufficiently admire. As the poor Indians lookt upon the Spaniards as more then Men, becaufe the knowledg. they had of the Properties of Nitre, Sulphur and Charcoale duely mixt, ennabled them to Thunder and Lighten so fatally, when they pleased. And this Empire of Man, as a Naturalist, over the Creatures, may perchance be to a Philosophical Soul preserved by reason untainted with Vulgar Opinions, of a much more satisfactory kind of Power or Soveraignty then that for which ambitious Mortals are wont so bloodily to contend. For oftentimes this Latter, being commonly but the Gift of Nature or Present of Fortune, and but too often the Acquist of Crimes, does no more argue any true worth or noble superiority in the possessor of it, then it argues one Brasse Counter to be of a better Mettal then its Fellowes, in that it is chosen out to stand in the Account for many Thousand Pounds more then any of them. Whereas the Dominion that Physiologie gives the

the Prosperous Studier of it (besides that it is wont to be innocently acquired, by being the Effect of his Knowledg) is a Power that becomes Man as Man. And to an ingenious spirit, the Wonders he performes bring perchance a higher satisfaction, as they are Proofes of his Knowledg, then as they are Productions of his Power, or even bring Accessions to his Store.

ESSAY II.

OF THE SAME.

THe next Advantage, *Pyrophilus*, that we mention'd the Knowledg of Nature to bring to the Minds of Men, is, That it therein excites and cherishes Devotion; Which when I say, *Pyroph.* I forget not that there are severall Divines (and some of them Eminent ones) that out of a Holy Jealousie (as they think) for Religion, labour to deterre men from addicting themselves to serious and thorough Enquiries into Nature, as from a Study unsafe for a Christian, and likely to end in Atheisme, by making it possible for Men (that I may propose to you their Objection as much to its Advantage as I can) to give themselves such an Account of all the Wonders of Nature, by the single Knowledg of Second Causes, as may bring them to disbelieve the Necessitie of a First. And certainly, *Pyrophilus*, if this Apprehension were well grounded, I should think the threatned Evill so considerable, that instead of inviting you to the Study of Naturall Philosophy, I should very earnestly Labour to Disswade you from it. For I, that had much rather have Men not Philosophers then not Christians, should be better content to see you ignore the Mysteries of Nature then deny the Author of it. But though the Zeale of their Intentions keep Me from harbouring any unfavourable Opinion of the Persons of these Men, yet the Prejudice that might redound from their Doctrine (if generally received) both to the Glory of God from the Creatures, and to the Empire of Man over them, forbids Me to leave their Opinion unanswer'd

swer'd; though I am Sorry that the Necessity of Vindicating the Study I recommend to You from so Heinous a Crime as they have accus'd it of, will compel me to Theologize in a Philosophical Discours: Which that I may do, with as much Brevity as the Weight and Exigency of my Subject will permit, I shall Content my selfe onely in the Explication of my own Thoughts, to hint to you the grounds of Answering what is alledg'd against them.

And First, *Pyrophilus*, I must premise, That though it may be a Presumption in Man, (who to use a Scripture Expression, *Is but of Yesterday, and knows Nothing, because his Dayes upon the Earth are but as a shadow*) precisely and peremptorily to define all the Ends and Aimes of the Omniscient God in His Great Work of the Creation; Yet, perhaps, it will be no great venture to suppose that at least in the Creating of the Sublunary World, and the more Conspicuous Stars, two of God's Principal Ends were, the Manifestation of His own Glory, and the Good of Men. For the First of these; *The Lord hath made all things for himselfe*, saies the Preacher; *For of Him, and through Him, and to Him, are all things*, saies the Apostle. And, *Thou hast Created all things; and for Thy Pleasure they are and were Created*, say the Twenty foure Prostrate Elders (Representatives, perhaps, of the whole Church of both Testaments, propagated by the Twelve Patriarchs, and the like number of Apostles) to their Creatour, which Truth, were it requisite, might be further confirmed by several other Texts, which to decline needlesse prolixity, I here forbear to insist on. Consonantly to this we hear the Psalmist Proclaiming that *The Heavens Declare the Glory of God, and the Firmament sheweth his Handy-Works*. To which purpose we may also observe, that though Man were not Created till the close of the Sixt Day (the Resident's Arrival being Obligingly Suspended till the Palace was made ready to entertain Him) yet that none of God's works might want Intelligent Spectators and Admirers

Job 8.9.

Prov. 16.4.

Rom. 11.36.

Psal. 19.1.

mirers, the Angels were Created the First Day, as Divines generally infer from the Words of God in *Job*; *Where wast thou when I laid the Foundations of the Earth?* and a little after; *When the Morning Stars sang together, and all the Sons of God shouted for Joy.* Where by the *Morning Stars* and *Sons of God* are suppos'd to be meant the newly Created Angels; one of whose earliest exercises was, it seems, to applaud the Creation, and take thence occasion to sing Hymnes to the Almighty Author of it. I should not, *Pyrophilus*, adde any thing further on this subject, but that having since the writing of these thoughts met with a Discourse of *Seneca's*, very consonant to some of them, I suppose it may tend to your delight as well as to their advantage, if I present you some of the Truths you have seen in my courser Languag, dreſt up in his finer and happier Expressions. *Curiosum nobis* (saith he) *natura ingenium dedit, & artis sibi pulchritudinisque conscia, spectatores nos tantis rerum spectaculis genuit, perditura fructum sui, si tam magna, tam clara tam subtiliter ducta, tam nitida & non uno genere formosa solitudini ostenderet; Ut scias illam spectari voluisse, non tantum aspici, vide quem locum nobis dedit; nec erexit tantummodo hominem, sed etiam ad contemplationem Viæ facturum; ut ab ortu sidera in occasum labentia prosequi posset & vultum suum circumferre cum toto, Sublime illi fecit caput, & collo flexibili imposuit. Deinde sena per diem, sena per noctem signa produxit; nullam non partem sui explicuit, ut per hæc quæ obtulerat ejus oculis cupiditatem faceret etiam cæterorum: nec enim omnia nec tanta visimus quanta sunt, sed acies nostra aperit sibi investigando viam, & fundamenta veri jacit, ut inquisitio transeat ex apertis in obscura, & aliquid ipso Mundo inveniat Antiquius.* And least you might be offended at his mentioning of Nature, and silence of God, give me leave to informe you, that about the close of the Chapter immediately preceding that, whence the Passage you come from Reading is transcrib'd, having spoken of the Enquiries of Philosophers into the Nature of the Universe, he adds, *Hæc qui contemplatur,*

Iob 38. 5, 7.

Sen. de Otio Sap. Cap. 32.

contemplatur, quid Deo præstat? ne tanta ejus Opera sine teste sint.

And to proceed to that which we have formerly assign'd for the Second End of the Creation; That much of this Visible World was made for the use of Man, may appear, not only from the time of his Creation (already taken notice of) and by the Commission given to the first Progenitors of Mankind, to *repleniſh the Earth, and ſubdue it, and to have Dominion over the Fiſh of the Sea, and over the Fouls of the Air, and over all the Earth, and over every living thing that creepeth or moveth on the Earth*: But also by God's making those noble and vast Luminaries, and other Bodies that adorn'd the Skie to give light upon the Earth, though inferiour to them in Dimensions, and *to divide between the Day and between the Night, and to be for Signes, and for Seasons, and for Daies, and for Years.* To this agrees that Passage in the Prophet, *Thus saith the Lord that Created the Heavens, God himselfe that form'd the Earth, and made it, He hath establiſhed it, He Created it not in Vaine, He formed it to be Inhabited, &c.* And the Inspired Poet speaks of Man's Dignity in very comprehensive Termes, *For thou* (saies he to his Maker) *hast made him little lower then the Angels, and hast Crowned him with Glory and Honour; Thou madest him to have Dominion over the Works of thy Hands, thou hast put all things under his Feet.*

Gen. 1. 28, 29.

Gen. 1. 14, 15, 16.

Is. 45. 28.

Psal. 5. 5, 6.

The same truth may be confirm'd by divers other Texts, which it might here prove tedious to insist on. And therefore I shall rather observe, that consonantly thereunto, God was pleased to consider man so much more then the Creatures made for him, that he made the Sun it selfe at one time to stand still, and at another time to goe back, and divers times made the parts of the Universe forget their Nature, or Act contrary to it; And ha's (in summe) vouchsafed to alter by Miracles the Course of Nature, for the instruction or reliefe of Man (As when the Fire suspended its destructive Opera-

Gen. 2. 28, 26, 29. Psal. 8. 7. Heb 2. 7. Iob. 5. 23. Ho. 2. 28, 21, 22. Rom. 8. 28. 2 Cor 3. 22. 2 Tim. 4 3.

tion, whilst the three resolute Jewes with their Protectour
2 King. 6. 5, 6. walk'd unharm'd in the mid'st of those flames that destroy'd the Kindlers; and as the heavy Iron emerg'd up to the swimming piece of wood, miraculously by *Elisha* made Magnetical.) And you may also, *Pyrophilus*, take notice, that when *Adam* had transgressed, immediatly the ground was cursed for his sake. And as it is not unusual in Humane Justice to raze the very houses of Regicides and resembling Traitours; So when the provocations of *Sodom* swell'd high enough to reach Heaven, God did not only Destroy the Inhabitants from the Face of the Earth, but for the Inhabitants Sins destroy'd the very Face of the Earth. So when in *Noah's* time a Deluge of Impiety call'd for a Deluge of Waters, God looking upon the living Creatures as made for the Use of Man, stuck not to Destroy them with him, and for him; but involv'd in his Ruine all those Animals that were not necessary to the perpetuation of the Species, and the Sacrifice due for *Noah's* preservation. And so when (in the Last daies) the Earth shall be repleniſh'd with those *Scoffers* mention'd by St *Peter*,
2 Pet. 3. 3, 5, 6, 7, 8, 10. *who will walk after their own Lusts*, and deride the Expectation of God's foretold coming to Judg and Punish the Ungodly, their Impiety shall be as well punisht as silenc't by the unexpected Flames (perhaps hastned by that very impiety) that shall either Destroy or Transfigure the World. For as by
Lev. 13. 54, 55. the Law of *Moses*, the Leprous Garment which could not be recover'd by being washt in Water, was to be burnt in the Fire, so the World which the Deluge could not Cleanse, a generall Conflagration must Destroy.

Nor is reason it selfe backward to countenance what we teach. For it is no great presumption to conceive, that the rest of the Creatures were made for Man, since He alone of the Visible World is able to enjoy, use, and relish many of the other Creatures, and to discerne the Omniscience, Almightinesse and Goodnesse of their Author in them, and returne Him praises for them. 'Tis not for themselves that the

Rubies

Rubies flame, other Jewels sparkle, the Bezar-stone is Antidotall; nor is it for their own advantage that fruitfull trees spend and exhaust themselves in Annual profusions. The Light which he diffuses through the World is useless to the Sun himselfe, whose inanimate being makes him incapable of delighting in his own splendor; which he receives but to convey it to the Earth, and other by him illuminated Globes: whence probably the Hebrewes call'd him *Shemesh*, which Grammarians derive from the Roote *Shemash* signifying in the Chaldean Tongue, *to serve*, or *minister to*; the Sun being the great Minister of Nature, and Servant general of the Universe. And as Animals alone among the Creatures seem to have a proper sense of, and complacency in, their own Being; So Man alone among Animals is endow'd with Reason, at least such a pitch of it, as by which he can discerne God's Creatures to be the Gifts of God, and referre them to their Creator's Glory. This truth I find not only embrac'd by Christians, but assented to even by Jewes and Heathens; Among the Jewes my Learned Acquaintance, *Manasseh Ben Israel*, professedly labours to prove it by Scripture and Tradition (though in some of his Arguments he might appear more a Philosopher, if he would have appear'd lesse a *Rabbi*) and among other passages I remember he alledges that, wherein the Wise man saies (as our Translators English it) *That the Righteous is an everlasting Foundation*; which he renders, *Justus est columna Mundi*, *The Just Man is the Pillar of the World*. And indeed if the Context did not somewhat disfavour the Interpretation, the Hebrew words [*tzaddik yesôd olâm*] would well enough bear the sense assigned them. Congruously whereunto, I remember that when *Noah* (who is call'd in Scripture a Righteous man, and κήρυξ δικαιοσύνης, a *Herald*, or Proclaimer *of Righteousnesse*) offer'd up that noble Sacrifice of all the sorts of clean Beasts and Fowles, as a Thank-offering for the Reprieve of the World, God is said to have *smelled a Savour of Rest*, and to have resolved in his

In Probl. de Creat.

Prov. 10. 25.

Gen. 6. 9.

2 Pet. 2. 15.

Gen.8.21,22. Heart never to Curse the ground for Man's sake, but to continue the vicissitudes of Summer, and Winter, Day, and Night, &c, as long as the Earth shall remain. And among the Philosophers themselves, the Truth we are now manifesting, has not been altogether ignor'd. For though *Seneca* somewhere, more wittily then truely, saies, *Non causa mundo sumus hyemem æstatémque referendi; suas ista leges habent, quibus divina exercentur. Nimis nos suspicimus, si digni nobis videmur, propter quos tanta moveantur:* Yet *Lactantius* (not to mention other Authors) tels us that *the Stoicks generally believed the World to have been made for man. Vera est* (saies he) *sententia Stoicorum, qui ajunt nostra causa Mundum fuisse constructum. Omnia enim quibus constat, quæque generat ex se Mundus, ad utilitatem hominis accommodata sunt.* And *Seneca* himselfe speaks elsewhere almost as if he had read and believed the beginning of *Genesis*; *Dii* (saies he) *non per negligentiam nos genuere, quibus tam multa genuerant: Cogitavit enim nos ante Natura quam fecit.*

2do De Ira cap.27.

De Ira Dei cap.13.

De Benef. cap. 23.

Nor were the Stoicks the only Philosophers to whom the Contemplation of the Universe discover'd this End of it. For to instance now in *Cicero* only; *Quorum igitur causâ* (saies that great Orator) *effectum esse mundum? Eorum scilicet Animantium, quæ ratione utuntur: Hi sunt Dii et Homines, quibus profecto nihil est melius.*

2do De Nat. Deor.

Having thus premised, *Pyrophilus*, that two of God's principal aimes in the Creation, were the manifestation of his own Glorious Attributes, and the Welfare of his noblest Visible Creature, Man; It will not be perhaps difficult for You to discerne, that those who labour to deterre men from sedulous Enquiries into Nature, do, (though I grant, designelessely) take a course which tends to defeat God of both those mention'd Ends.

For to speak first to the Last of them; that man's external fruition of the Creatures, and the Delight and Accommodation which they may afford him, must be highly prejudic'd and

and impair'd by his ignorance of that Natural Philosophy, wherein his Dominion over the Creatures chiefly consists, what we shall say hereafter concerning the usefulnesse of the Knowledg of Nature to humane Life, will sufficiently evince. But such an Animal fruition (if I may so call it) of the Works of Nature, affords not Man all the good that God design'd him in them. For Religion being not only the great Duty of Man, but the grand Instrument of his future Happinesse, which consists in an Union with and Fruition of God, during that endlesse Terme that shall succeed the expiration of his transitory Life on Earth; what ever increases or cherishes his Religion deserves to be lookt on as a great contributer to his Happinesse. And we may therefore venture to affirme that the knowledg of the Creatures does lesse advantage Man, as it ennables him to Master them; then as it Assists him, by admiring and serving him, to become Acceptable to their Author. And what ever our distrustful Adversaries are pleas'd to surmise to the contrary, certainly God intended that his Creatures should afford not only Necessaries, and Accommodations to our Animal part, but Instructions to our Intellectual. The World is wont to be stil'd not unfitly by Divines, *The Christians Inne*; but perchance it may be altogether as properly call'd *his Ship:* for whereas both Appellations suppose him a Traveller, the Inne, though it refresh him in his Journey, does not further him in it, but rather retard his progresse by detaining him in one place; whereas a Ship not only serves the Passenger for an Inne when he is weary, but helps to convey him towards his Journey's End. And according to this Notion, to suppose that God hath placed in the World innumerable things to feed Man, and delight him, and none to instruct him, were a conceit little lesse injurious to God, then it were to a wise Merchant, that sends Persons, he loves, to a farre Country, to think that he would furnish their Cabinets with plenty of Provisions, soft Beds, fine Pictures, and all other accommodations for their Voyage, but send them to

Sea disprovided of *Sea-Charts* and Mariners Compasses, and other requisite helps to steer their Course by, to the desired Harbour.

And indeed so farre is God from being unwilling, that we should Prye into his Works, that, by divers Dispensations he imposes on us little lesse then a necessity of studying them. For first he begins the Book of Scripture with the Description of the Book of Nature; of which he not only gives us a general account, to informe us that he made the World; since for that end the very first Verse in the Bible might have suffic'd: But he vouchsafes us by retaile the Narrative of each Day's Proceedings, and in the two first Chapters of *Genesis*, is pleas'd to give nobler hints of Natural Philosophy, then men are yet perhaps aware of. Though that in most other places of the Scripture, where the Works of Nature are mentioned but incidently, or in order to other purposes, they are spoken of rather in a Popular then Accurate manner, I dare not peremptorily deny, being unwilling to intereſse the reputation of Holy Writ (design'd to teach us rather Divinity then Philosophy) in the doubtful contentions of Naturalists, about such matters as may (though the History of the Creation cannot) be known by the meer Light of Natural Reason. We may next observe, that God has made some knowledg of his Created Book, both conducive to the beliefe, and necessary to the Understanding, of his Written one: Our Saviour making it one cause of the Sadduces great Error about the Resurrection, that they *knew not the Power of God.* And the Scripture being so full of Allusions to, and comparisons borrowed from the properties of the Creatures, that there are many Texts not clearly Intelligible without some knowledg of them; as may appear even by the first Gospel (The Promise *that the Seed of the Woman should Bruise the Serpents Head, and have his Heele bruised by that subtle Creature)* preached to fallen Man in Paradise, and by the representation of the Worlds Four great Monarchies, and the *Genius* of each

of

of them, under the Notion of Four Beasts, in *Daniels* prophetick Vision: and that often repeated Precept of our great Master to his Disciples, is coucht in an expression alluding to the properties of Animals:. For where he commands them to be Wise as Serpents, and Harmlesse as Doves, he does not only recommend to them a Serpentine warinesse in declining dangers, but seems also to prescribe not alone an inoffensiveneſse towards others (the conspicuousneſse of which quality in Pigeons have made them, though erroneously, be supposed to have no Gall) But also as harmlesse a way of escaping the dangers they are actually ingaged in, as that of Doves, who being pursued by Birds of Prey, endeavour to save themselves not by fight but, only by flight.

And indeed so many of the Texts in Scripture are not to be competently illustrated, without some knowledg of the properties of the Creatures related to in them, that I wonder not, that *Levinus Lemnius*, *Frantzius*, *Rueus*, and other Learned Men have thought it requisite to publish entire Treatises, some of the Animals, others of the Stones, and others of the other Works of Nature mentioned in Scripture: Only I could wish that they had been as wary in their Writings, as commendable for their Intentions, and had not sometimes admitted doubtful or fabulous accounts into Comments upon that Book, whose Prerogative it is to teach nothing but Truth.

Nor ought their Labors to deterre others from cultivating the same Theme; For as (such is Gods condescention to Humane weakneſse) most of the Texts, to whose Exposition Physiologie is necessary, may be explicated by the knowledg of the external, or at least more easily observed qualities of the Creatures; So, that there are divers not to be fully understood without the Assistance, of more penetrating indagations of the Abstrusities of Nature and the more unobvious properties of things, an Intelligent and Philosophical peruser will readily discerne.

Now

Now if you ſhould put me upon telling you, *Pyrophilus*, whatthoſe Attributes of God are, which I ſo often mention to be viſibly diſplay'd in the Fabrick of the World, I canreadily anſwer you, that though many of Gods Attributes are legible in his Creatures, yet thoſe that are moſt conſpicuous there, are his Power, his Wiſdome, and his Goodneſſe, in which the World, as well as the Bible, though in a differing, and in ſome points a darker way, is deſigned to inſtruct us, which that you may not think to be affirm'd *gratis*, we muſt inſiſt a-while on each of the Three.

And firſt, How boundleſſe a power, or rather what an Almightineſſe is eminently diſplayed in Gods making out of Nothing all Things, and without Materials or Inſtruments conſtructing this Immenſe Frabrick of the World, whoſe Vaſtneſſe is ſuch, that even what may be prov'd of it, can ſcarcely be conceived, and after a Mathematical Demonſtration, its Greatneſſe is diſtruſted? Which yet is, I confeſſe, a wonder leſſe to be admir'd then the Power expreſſed by God in ſo immenſe a Work, which nevertheleſſe ſome moderne Philoſophers (whoſe opinions I find ſome Cabaliſts to countenance) ſuppoſe to be not the only Production of Gods Omnipotence. Not to mention *Elephants*, or *Whales*, ſome of which an Hyperboliſt would not ſcruple to call moving Mountains and Floting Iſlands; and to paſſe by thoſe ſtupendous Hils, and thoſe Seas, where the Light looſes it ſelfe, as Objects which their neerneſſe only repreſents ſo Bulky; let us haſten to conſider, that whereas the Terreſtrial Globe we Men inhabit, containes, beſides all thoſe vaſt Kingdomes the Unions of ſome of which conſtituted the Worlds foure celebrated Monarchies, thoſe ſpacious (ſince detected) American Regions, that have been deſervedly ſtiled *The New World*: And that whereas the Common Account makes the circuit of this Terreſtrial Globe to be no leſſe then 22600 *Italian* miles, conſiſting each of 1000 Geometrical Paces (which number the more recent account of theaccurate *Gaſſendus* makes amount

amount to 26255 Miles of the same measure) whereas, I say, this Globe of Earth and Water seems to us so vast, Astronomers teach us, that it is but a Point in comparison of the Immensity of Heaven; which they not irrationally prove by the Parallaxis (or Circular difference betwixt the place of a Star, supposed to be taken by two Observations, the one made at the Centre, and the other on the surface of the Earth) which *Gassendus* confesseth to be undiscernable in the fixt Stars: as if the Terrestrial Globe were so meer a Point, that it were not material, whether a fixt Star be look'd upon from the Centre, or from the surface of the Earth. This may lessen our wonder at the *Ptolomæans*, making the Sun (which seems not half a Foot over) to be above a hundred sixty and six times bigger then the Earth; and distant from it One thousand one hundred sixty and five Semi-Diameters of the Earth, each of which contains, according to the afore-mentioned computation of *Gassendus*, 4177 Miles; and at their supposing the fixt Stars (whose distance the same Author, as a *Ptolomæan*, supput's to be 19000 Semi-Diameters of the Earth) so great, that they conclude each of the fixt or smallest Magnitude to be no less then 18 times greater then the whole Earth, & each Star of the First or Chief Magnitude to exceed the Terrestrial Globe 108 times. And as for the *Copernicans* (that growing Sect of Astronomers) they, as their *Hypothesis* requires, suppose the vastness of the Firmament to be exceedingly greater then the Ancients believed it. For *Philippus Lansbergius*, who ventur'd to assign Distances and Dimensions to the Planets and Fixt Stars (which *Copernicus* forbore to do) supposes as well as his Master, that the Great Orb it self (as the *Copernicans* call that in which they esteem the Earth to move about the Sun) though its Semi-Diameter be suppos'd to be 1500 times as great as that of the Earth, is but as a Point in comparison of the Firmament or Sphere of the Fixt Stars; which he supposes to be distant from the Earth no less then 28000 Semi-Diameters of the Great Orb, that is, 42000000 of Semi-

Gassend. Inst. Astr. lib. 2. c. 13.

Gassend. lib. 3. cap. 11.

diameters of the Earth; or according to the former Computation of common Miles 175434000000, which is a Distance vastly exceeding that which the *Ptolomæans* ventur'd to assign, and such as even imagination it self can hardly reach to. I confess indeed, that I am not so well satisfied with the exactness (nor perhaps with the Grounds) of these kinde of Computations, by reason of the Difficulty I have met with in making exact Celestial Observations with either Telescopes, or other Instruments, sufficiently witness'd, by the great disparity remarkable betwixt the Computations of the best Artists themselves. But on the other side I am not sure, but that even the *Copernicans* ascribe not too great a distance to some of the Fixt Stars; since (for ought we yet know) those of the sixth Magnitude, and those which our Telescopes discover (though our bare Eyes cannot) are not really less then those of the first Magnitude, but onely appear so by reason of their greater Distance from our Eyes; as some Fixt Stars seem no bigger then *Venus* and *Mercury*, which are much lesser then the Earth. And therefore upon such Considerations, and because the modestest Computation allows the Firmament to be great enough to make the Earth but a Point in comparison of it; it will be safe enough, as well as just, to conclude with the Psalmist, *Great is the Lord, and greatly to be praised; and his greatness is unsearchable.*

The next Attribute of God that shines forth in his Creatures, is his Wisdom; which to an intelligent Considerer appears very manifestly express'd in the World, whether you contemplate it as an Aggregate or System of all Natural Bodies, or consider the Creatures it is made up of, both in their particular and distinct Natures, and in Relation to each other, and the Universe which they constitute. In some of these the Wisdom of God is so conspicuous, and written in such large Characters, that it is legible even to a vulgar Reader: But in many others the Lineaments and Traces of it are so delicate and slender, or so wrapt up and cover'd with Corporeity, that

it

it requires an attentive and intelligent Peruſer. So numberleſs a multitude, and ſo great a variety of Birds, Beaſts, Fiſhes, Reptiles, Herbs, Shrubs, Trees, Stones, Metals, Minerals, Stars, *&c.* and every one of them plentifully furniſh'd and endow'd with all the Qualifications requiſite to the Attainment of the reſpective Ends of its Creation, are productions of a Wiſdom too limitleſs not to be peculiar to God: To inſiſt on any one of them in particular (beſides that it would too much ſwell this Diſcourſe) might appear injurious to the reſt; which do all of them deſerve that extenſive Exclamation of the Pſalmiſt, *How manifold are thy works, O Lord; in Wiſdom haſt thou made them all.* Pſal. 104. 24. And therefore I ſhall content my ſelf to obſerve in general, That as highly as ſome Naturaliſts are pleaſed to value their own knowledge, it can at beſt attain but to underſtand and applaud, not emulate the Productions of God. For as a Novice, when the curioſeſt Watch the rareſt Artiſt can make, is taken in pieces and ſet before him, may eaſily enough diſcern the Workmanſhip and Contrivance of it to be excellent; but had he not been ſhown it, could never have of himſelf deviſed ſo skilful and rare a piece of Work: So, for inſtance, an Anatomiſt, though when by many and dexterous Diſſections of humane Bodies, and by the help of Mechanical Principles and Rules (without a competent skill wherein, a Man can ſcarce be an Accompliſh'd and Philoſophical Anatomiſt) he has learn'd the Structure, Uſe and Harmony of the parts of the Body, he is able to diſcern that matchleſs Engine to be admirably contriv'd, in order to the exerciſe of all the Motions and Functions whereto it was deſign'd: And yet this Artiſt, had he never contemplated a humane Body, could never have imagin'd or deviſ'd an Engine of no greater Bulk, any thing near ſo fitted to perform all that variety of Actions we daily ſee perform'd either in or by a humane Body. Thus the Circular motion of the Blood, and ſtructure of the Valves of the Heart and Veins (The conſideration whereof, as himſelf told me, firſt hinted the Circulation to our Famous *Harvey*) though

now Modern Experiments have for the main (the *Modus* seeming not yet so fully explicated) convinc'd us of them, we acknowledge them to be very expedient, and can admire Gods Wisdom in contriving them: Yet those many Learned Anatomists, that have for many succeeding Ages preceded both Dr *Harvey*, and *Columbus*, *Cæsalpinus*, *Padre Paulo*, and Mr *Warner* (for each of these four last are suppos'd by some to have had some notion of the Circulation) by all their diligent contemplation of humane Bodies, never dream'd (for ought appears) of so advantagious an use of the Valves of the Heart, nor that nimble Circular motion of the Blood, of which our modern Circulators think they discern such excellent Use, not to say, Necessity.

And though it be true, that the greater Works of God do as well declare his great Wisdom as his Power, according to
Prov. 13. 19, 20 that of the Inspired Philosopher; *The Lord by Wisdom hath founded the Earth, by Understanding hath he establish'd the Heavens. By his Knowledge the depths are broken up, and the Clouds drop down the Dew*: Yet does not his Wisdom appear less in lesser Creatures; for there is none of them so little, but it would deserve a great deal of our Wonder, did we attentively enough consider it. And as *Apelles* (in the Story) was discover'd by the skilful *Protagoras*, by so neat and slender a Line, that *Protagoras*, by being scarce able to discern it, discern'd it to have been drawn by *Apelles*: So God, in these little Creatures, oftentimes draws traces of Omniscience, too delicate to be liable to be ascrib'd to any other Cause. I have seen Elephants, and admir'd them less then the structure of a dissected Mole, which hath better Eyes then those, that will not see a designation in the dimness of its Eyes (made onely to see the Light, not other Objects by the help of it) and the unwonted posture of its Feet, given it not to run on the Ground, but to dig it self a way under Ground. And, as despicable as their Littleness makes the Vulgar apt to think some Creatures, I must confess my wonder dwells not so much on Natures

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Clocks (if I may ſo ſpeak) as on her Watches, and is more exerciſ'd in the coyneſs of the ſenſitive Plant, and the Magnetical Properties of a ſmall and abject Load-ſtone, then the bulk of the talleſt Oakes, or thoſe vaſt Rocks, made famous by Shipwracks. I have paſſ'd the *Alpes*, and have ſeen as much to admire at in an Ant-hill, and have ſo much wondred at the Induſtry of thoſe little Creatures themſelves that inhabited it, that I have ceaſ'd to wonder at their having given a Theme to *Solomon's* Contemplation. Thoſe vaſt Exotick Animals which the Multitude flocks to ſee, and which Men give Money to be allow'd to gaze on, have had many of them leſſe of my Admiration, then the little Catterpillar (as Learned Naturaliſts eſteem it) to which we are beholden for Silk. For (not to mention all the Obſervables crouded by Nature in that little Worm) I thought it very well deſerv'd my wonder (when not long ſince I kept ſome of them purpoſely to try Experiments) how this curious Spinſter, after he had buryed himſelf alive in the precious Tomb he had wrought for himſelf out of his own Bowels, did caſt off his former Skin and Legs, and, in ſhew, his former Nature, appearing for divers days but an almoſt moveleſſe Magot; till at length, diveſting this ſecond Tegument alſo (in which Neſt, Phenix-like, he had been regenerated out of his own Remains) he came forth (if I may ſo ſpeak) out of this attiring Room under another form, with Wings, Eyes, and Leggs, *&c.* to act a new part upon the Stage of the World; which (having ſpent ſome days without feeding (that I could obſerve) in providing for the propagation of his Species) he forſakes and dies. And I the rather mention the Silk-Worm, becauſe that there have been of late divers ſubtle Speculators, who would fain perſwade us, That Animals do nothing out of Inſtinct, or, if you pleaſe, innate or ſeminal Impreſſions; but Spin, build Neſts, and perform all the other Actions for which they are admir'd, barely by Imitation of what they have ſeen done by others of the ſame Kinde. But in the Silk-Worm

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(at leaſt here in *England*) this plauſible Opinion will not hold: For the Silk-worms I kept, were not hatch'd but in the Spring, out of Eggs laid ſome Days in the Sun; and the Worms that laid thoſe Eggs, being every one of them dead the Winter before, it was impoſſible theſe new Silk-Worms, when they firſt began to ſpin their ſcarce imaginable fine Web, and incloſe themſelves in Oval Balls of a very Artificial Figure and Texture, ſhould have wrought thus by Imitation; there not having been for many Moneths before, in the place where they were hatch'd (nor perhaps in the whole Country) any Silk-Worms alive which they might imitate. But I muſt leave theſe curious Spinſters to their Work, and proceed to tell you, That Seas and Mountains, with the other Hyperboles of Nature (if I may ſo term them) proclaim indeed Gods Power, but do not perhaps more manifeſt his Wiſdom, then the contrivance of ſome living Engines, and (if I may ſo call them) Breathing Atoms, that are ſo ſmall that they are almoſt all Workmanſhip; ſo that, as before, in the Pſalmiſts Expreſſion we truly ſaid of Gods Greatneſſe, *That it was unſearchable*; we may now as truly ſay of his Wiſdom in the Prophets Words, and in the ſame Text where he repreſents him as the
Iſa. 40. 28. Creator of the ends of the Earth, *That there is no ſearching of his Underſtanding*.

And if I durſt, *Pyrophilus*, make this part of this Eſſay of a length too diſproportionate to the reſt, I could eaſily, as well as willingly, repreſent to you divers things which might ſerve
Eph. 3. 10. to Illuſtrate the πολυποικίλος σοφία τοῦ Θεοῦ, *manifold Wiſdom of God* (as St. *Paul* ſpeaks on another occaſion) But though I dare not expatiate on this Subject, yet neither dare I altogether conceal from you, that I have ſometimes admired to ſee what ſcarce imaginable variety of living Engines his Plaſtick skill (if I may ſo ſpeak) has been able to produce, (eſpecially in the Waters) without ſcarce any other reſemblance betwixt them, then that they are each of them excellent in its own Kinde, and compleatly furniſh'd according to the exigency of its

its Nature. And that which much encreases this Wonder, is the disproportion of those living Engines, wherein the great [*Yotzêr hakkôl*] *Former of all things* (as the Scripture justly calls God) has been pleas'd to display an almost equally skilful Contrivance. Amongst Terrestrial Animals we have the Elephant, of whose stupendious vastness such strange things are related, even by eminent Writers, that I know not well how either to dis-believe them; or give credit to them: And therefore we shall content our selves to mention that which is left on Record by the accurate *Gassendus* in the Life of *Peireskius*; For this matchless Gentleman having caus'd an Elephant, in the Year 1631, to be weigh'd in a Scale, purposely provided, he was found to weigh, of the Roman Pounds (consisting of twelve Ounces apiece) very near Five thousand: And yet surely that this Elephant was very far from being one of the largest of that sort of Beasts, he that shall consider the bigness and length of some of their Teeth, as they are commonly call'd, which are to be seen at divers places, both in *England* and elsewhere, and is not resolv'd not to believe the consonant Relations of Eastern Travellers (among whom *Linschoten* tells us there have been some Teeth found to weigh Two hundred pounds apiece, each pound consisting of twenty four Ounces) may be easily perswaded. On the other side let us reflect upon the smalness of some Terrestrial Animals; and not to mention that little white Creature bred in Wax, which *Aristotle* calls Ἄτομοι, and speaks of as suppos'd to be the least of all living Creatures whatsoever: Let us consider those little Mites that are bred in mouldy Cheese; for divers of these scarce amount to the weight of a Grain, and every Pound containing Five thousand seven hundred and sixty Grains; supposing each Mite did weigh a whole Grain, yet that formerly mention'd small Elephant would exceed him near 28800000 times. And yet though a Mite seem but a moving Atome, and unless there be divers together, is not easily discern'd by the unassisted Eye; yet in an excellent Microscope I have, you know, several

Jer. 10. 16.

Gassend: in Vit. Peireskii, lib. 4.

ſeveral times both ſeen and ſhewn to others, even in a gloomy Day, and a diſadvantageous Place, not onely the Limbs of this little Animal, but the very Hair growing upon his Legs. Now let us but conſider how ſtrangely skilful and delicate a Workmanſhip muſt be employ'd to contrive into ſo narrow a compaſs, the ſeveral Parts Internal and External, requiſite to make up this little Animal; how many muſt goe to the texture of the Eyes, and other Organs of Senſe; how many to the Snout (which he has, not unlike a Hog) and the ſeveral parts of it; how many to the Stomach and Guts, and the other Inward Parts addicted to the digeſtion of Aliment, and excluſion of Excrements; and to be ſhort, how inimaginably ſubtle muſt be the Animal Spirits running too and fro in Nerves ſuitable in ſuch little Legs: And if, as we have obſerv'd them to multiply by Eggs, the little Creatures be hatch'd in thoſe little Eggs, after the manner of divers other Oviparous Animals, how much ſmaller then a hatched Mite muſt be a Mite upon the Animation of its delineated Parts? ſince in Hens Eggs we have ſometimes ſeen the Chick manifeſtly alive, and its Limbs clearly delineated, whilſt yet it took up ſo ſmall a portion of the Egge, that both the White and the Yolk (betwixt which it is generated, and not of the *Chalaza* or *Tredle*, as *Aquapendente* and other Moderns teach) ſeem'd to be ſometimes yet intire, as well as involv'd in their peculiar Membranes. But it is not ſo conſpicuous in gradient Animals (if I may ſo ſpeak) as in ſwimming ones; How vaſtly diſproportionate Maſſes of Matter the wiſe *Former of all things* can faſhion into living Engines. For Whales are much more ſtupendious Creatures then Elephants: And not to mention what *Hartenius* (*apud Johnſtonum*) tells us of twenty ſorts of Whales, whereof the eighteenth Species, which he calls *Nordhwal*, is by him related to be Ninety Ells long; but what Ells he means, I know not: Nor to mention thoſe leſs incredible Accounts which are given of the vaſtneſs of Whales by our Engliſh Navigators, who are wont to Fiſh for them; I ſhall onely ſet down

down what is related by one of the eminenteſt Modern *Lyncean* Philoſophers, becauſe he ſpeaks as an Eye-witneſs, when he tells us, That in the Year 1624, there was caſt upon a place near *Santa Severa*, about 30 Miles from *Rome*, a dead Whale of 91 Palms in length, and 50 in thickneſs: He adds, That its Mouth was 16 Palms long, and 10 high; in which, being opened and kept gaping; a Man on Horſe-back might finde competent room; this Mouth being uſed to harbor a Tongue of twenty Palms (which may make out fifteen Foot) in length. The ſame inquiſitive Writer adds, That four Years before, near the Iſland of *Corſica*, not far from the Coaſt of *Italy*, another Whale was caſt, One hundred Foot long; which being a Female, was found to be big with a Cub of thirty Foot long, 1500 pound weight. But that which will let you ſee, *Pyrophilus*, the diſproportion betwixt theſe kinde of Fiſhes and common Elephants, is, that which the ſame Author adds, *That the Lard onely, or Fat* (as he ſpeaks *Carnea pinguedo*) *of this corpulent Creature, weigh'd One hundred and thirty five thouſand pound*, that is, above Twenty ſeven times the weight of the whole Elephant, which was cauſ'd to be weigh'd by *Peireskius*. And though the Omnipotent Creator be able to make ſwimming Creatures of ſuch prodigious bigneſs, that the Ocean it ſelf may ſeem to be but a proportionate Pond for ſuch Fiſhes; yet is the ſame Omniſcient Continuer, as able to make a ſwimming Engine more ſlender then a Cheeſe-mite, and ſo little, that a ſmall part of a Grain may out-weigh divers of them. For, *Pyrophilus*, I muſt here acquaint you with a ſtrange Obſervation, which I have been inform'd to have been ſome while ſince made in *Italy* by *Panarola* a Famous Phyſitian in *Rome*, who is ſaid, by the help of an excellent Microſcope, to have diſcern'd in Vinegar ſmall Living Creatures, which he takes to be Worms. The mention of ſo unlikely an Experiment, made me engage ſome excellent Philoſophers and Mathematicians to aſſiſt me in examining it: But though our Microſcopes exceeded the beſt that were

Jo: Faber Lynceus in his Expoſition of ſome Paſſages of *p.* 568.

brought us over from *Rome*, yet all our diligence and attention did but make them conclude that *Panarola*'s Eyes had been deluded. Notwithstanding which, causing a somewhat hollow bottom of pure Crystalline Glasse to be fitted to my Microscope, I prosecuted the Enquiry my self; and at length was so lucky, as not onely to discover these little Creatures with a Microscope, but by holding the Liquor in a Crystal Viol, almost upon the strong Flame of a Candle, to discover multitudes of them with my naked Eyes, as weak as they are. But though I have already convinc'd those that formerly derided such Observations, as not to be made with the best Microscope, yet the great weakness of my Sight has not permitted me to perfect my Observations concerning these Creatures. And therefore reserving the more particular mention of this odde Observation till another time, I shall now onely tell you as much as is pertinent to our present purpose; namely, That having with a certain parcel of strong White-wine Vinegar (for 'tis not in every Vinegar that they are constantly to be found) fill'd up to the top thin Viols with long and slender Necks; and having likewise with the same Liquor fill'd other small Crystalline Viols, though short-neck'd, and held them betwixt my Eye and the Sun, or a Window open towards it, or very near a great Candle, I have often in these Glasses, especially in their slender Necks, after having a while fix'd my Eye on them (attention being in this case very necessary) admiringly observ'd great numbers (and sometimes as it were Shoals) of living Creatures, which seem'd to be rather Fishes then Worms; for they swim freely up and down the Liquor, and often hover about the top of it, with a wrigling motion, like that of Eels, to which likewise their long and slender shape resembles them. And though these swimming Creatures be not all exactly of a size, yet some of them seem'd slenderer then any sort of living ones, that hath hitherto been taken notice of by the unassisted Eye: And I remember, that having look'd in a good Microscope upon one of them, and a Cheese-

mite

mite much about the same time, the Fish appear'd so slender, that we judg'd it not much thicker then one of the Legs of the Mite: So that considering what a vast deal of matter the great Creator can manage and fashion into a Whale, and in how little room he can contrive all the parts requisite to constitute a Fish, we may justly say to him in the Psalmists Language, *There is none like unto thee (O Lord) neither are there any works like unto thy works.* Psal. 86. 8.

The last of the three Properties of God, which we mentioned him to have manifested in the Creation, is his Goodnesse; Of which all his Creatures do in their due measure partake, partly by their having a Being vouchsafed them, and partly by their being preserved in it as long as their subordination to higher purposes, and to more powerful creatures do permit, by that supporting Influence of God which keeps them from relapsing into their first Nothing; according to that memorable Passage, where *Nehemiah* having mentioned God as *the Creatour of the Heavens, the Earth, the Seas, and all the Creatures belonging to them*, He calls Him the Preserver, or (as the Original has it) *The enlivener of them all.* And as for Animals, who are more capable of enjoying, though not most of them of discerning His bounty, His Goodnesse to them is more conspicuous. For besides that in Scripture he is called *The Preserver both of Man and Beast*, and accordingly is said to *give food even to the young Ravens that cry*, and to have after the *Flood* remembred not only *Noah*, but *every living thing that was with him in the Ark*, His Goodnesse to them is apparent by the plentiful and easily attainable provision he makes according to the exigence of their several Natures. For that innumerable swarm of various Birds, Beasts, Fishes, Reptiles, and other Animals that People the Terrestrial Globe, and the contiguous parts of the World, and by his endowing each of them, with all the Qualifications requisite to the perpetuation of their Species, and the preservation of their Lives, as far forth as is consistent with his Ends Nehem. 9. 6. Gen. 8. 1.

in their Creation. But most resplendent does the Goodnesse of God appear towards his Favourite Creature, Man, whom having vouchsaf'd to ennoble with his own Image, he makes most of the Creatures of the world visible to us, pay homage to him, and in some manner or degree do him service: God's liberality at once bestowing on him all those Creatures by endowing him with a Reason enabling him to make use of them; so that even those Creatures which he is not able to subdue by his Power, he is able to make serviceable to him by his Knowledg; as those vast Globes of Light, which are so farre above him, that their Immensity and Brightnesse can scarce render them visible to him, are by man's Mathematicks forced to give him an account of all their Motions, and waiting upon his Dials keep time for him; and even the defects of such works of Nature, are by man's skill made serviceable to him, as the Eclipses of the Moon serve Geographers notably in that difficult and useful worke of finding Longitudes. The Stars serve for Candles to give man light, and the Celestial Orbs are his Candlesticks. He breaths the Aire, the Fire warmes him, and serves him not only in his Kitchin, but to master most other Bodies in his furnaces. The Clouds water his Land, the Earth supports him and his Buildings, the Sea and winds convey him and his Floating-houses to the remotest parts of the World, and enable him to possesse every where almost all that Nature or Art has provided for him any where. The Earth produces him an innumerable multitude of Beasts to feed, cloath, and carrie him; of Flowers and Jewels to delight and adorne him; of Fruits, to sustaine and refresh him; of Stones and Timber, to lodg him; of Simples, to cure him; and in summe, the whole sublunary World is but his Magazine. And it seems the grand businesse of restlesse Nature so to constitute and manage his Productions, as to furnish him with Necessaries, Accommodations, and Pleasures.

Of

Of such a Number of Plants, Animals, Metals, Minerals, &c. that people and enrich the Terrestriall Globe, perhaps there is not any one, of which Man might not make an excellent use, had he but an insight into its Nature: nor are the most abject and despicable therefore the least useful. There is not any Stone, no not the sparkling Diamond it self, to whom Man is so much beholden, as he is to the dark & unpromising Load-stone, without which the New-World probably had never been detected, and many Regions of the Old World would have little or no commerce with each other. Nor have the *Lion*, the *Eagle*, and the *Whale*, joyned all together (though reputed the Chief of Birds, Beasts, and Fishes) been so serviceable to Man, as that despicable Insect, *The Silk-worm*. And if we impartially consider the Lucriferousness (if I may speak in my Lord of St *Albans* Stile) of the properties of Things, and their Medical Virtues, we shall finde, That we trample upon many things, for which we should have cause to kneel, and offer God Praises, if we knew all their Qualities and Uses: But of this subject we may elsewhere purposely treat.

To which I must onely adde, *Pyrophilus*, That you will injure Nature, if you suppose, either that all the Concretes, endowed with excellent Properties, have long since been notorious, or that all the Medicinal Virtues of Simples, commonly us'd, are already known; or that all those Concretes are destitute of considerable Properties, to whom none have been yet ascrib'd by eminent Authors. For almost every day either discloses new Creatures, or makes new Discoveries of the usefulnesse of things; almost each of which hath yet a kinde of *Terra incognita*, or undetected part in it: How many new Concretes, rich in Medicinal vertues, does the New World present the Inquisitive Physitians of the Old? *Notatu dignum* (says the Ingenious *Piso*, in his newly publish'd *Medicina Brasileensis*, *lib.* 1.) *quod eximiæ tot arbores, frutices, & innumeræ herbæ, figura, foliis & fructibus a veteris orbis Vegetabilibus, paucis ex-*

exceptis, dissimillimæ appareant. Idem de avibus, animantibus & piscibus deprehenditur, ut & insectis alatis, atque aliis destitutis; quæ ineffabili colorum pulchritudine & portentosa multitudine generantur, partim nota nobis, partim incognita. And of the known *American* Simples, How many latent Virtues does experience from time to time discover? And (to mention now no others) the Febrifugal property of that *Peruvian* Tree, called by the Natives *Gannanaperide*, whose Bark, call'd commonly *China Febris*, has been at *Rome*, and freshly also at *London*, found so wonderfully effectual against those stubborn Diseases, *Quartain Agues*; and though a Learned Author endeavors to depreciate it, by alledging, That it is wont rather to suspend the Fits, then truly cure the Disease, which after awhile will return again; yet, besides that, it may be often very beneficial to a weakned Patient, to have his Fits put off, the Physitiã thereby also gaining Opportunities to imploy strengthning and preventing Remedies: Besides this, I say, if you will credit that great Person, Sir *Kenelm Digby*, it is rather the Patients or Doctors fault, then the Medicines, if the Disease return. For having purposely consulted him about this Objection against the Use of the *Cortex Febrifugus*, he solemnly assur'd me, That of betwixt Twenty and Thirty Persons, that he had himself cur'd of *Quartanes* by this Remedy, not so many as Two fell into a Relapse.

And now I am upon the more freshly discover'd Virtues of *American* Drugs, I might acquaint you with the admirable Properties, not onely in Diseases, but even in Wounds of a certain Mineral, which (though careful examination of it has not yet taught me to what Species of Stones to reduce it) you cannot but have heard mention'd with wonder, under the name of Sir *Walter Raleigh*'s Stone, which my Father, ὁ μακαείτης, enjoy'd, and did strange things with for many years, and by his Will bequeathed (as the highest Legacy he could leave him) to his dearest Friend, the most Learned and Famous Dr *Usher, Primate of Ireland:* But of this Stone, the merit of the subject

ject makes me reserve what I have to say, to a Discourse, wherein I may be allowed to say more to it then now I dare: and therefore I shall proceed to tell you, that 'tis not in the Simples of the New World onely, that new Medicinal properties may be discover'd; for even those which daily obtrude themselves upon our careless Eyes, or are trampled under our regardlesse Feet, may possesse Virtues, to which the major part of Botanists are mere Strangers. To which purpose, I remember that I have often gather'd a little short-liv'd and despicable Plant, with which alone (slightly infus'd in Beer) I lately knew a yong Kinsman of Sir *Kenelm Digby*'s, in few Days, and without pain, as both Himself, his Mother, and his Physitian assur'd me, cur'd of that stubborn and seldom vanquish'd Disease of the Kings Evil, against which it doth Wonders; and yet having consulted not onely some of the famousest and recentest Herbals, both English and Latine, about this, but also enquired of two or three eminent Herbarists, I could finde neither any such Virtue, nor almost any at all, ascrib'd by Authors to that excellent Plant.

And whereas Gods bounty to Man in the Creatures, seems a little clouded and streightned by his permitting some Poisonous Plants and Venomous Animals to have a Being in Nature; to that it may be reply'd, First, That many Poisonous Bodies contain their own Antidotes; insomuch that the diligent *Piso*, who hath had great opportunities to examine the Effects of both, ventures to say, treating of the Poisons and Antidotes to be met with in *Brasil*, *Equidem vix dixeris, Venena an Alexiteria plura sint pronata*: and a little lower, *Sic folia, flores, & fructus herbarum Tangaraca & Juquerii, venena Brasiliæ facile prima, propriam suam unaquæq; radicem oppositum habet Antidotum*: and a little after, *Barbari viperarum pinguedinem & capita, tum & integra Insecta quæ vulnera intulerint, ex arte parata, audacter & felici cum successu venenatis ictibus applicant; adeoq; per ipsos effectus comprobare nituntur in omni veneno contineri suum Antidotum*: And next, that the

the noxiousneſſe of many (and therefore not improbably of all of them) is not ſo incorrigible, but that by Mans Art and Chymical Preparations, they may be made, not onely innocent and harmleſs, but uſeful too. This Truth, *Pyrophilus*, Antimony and Quick-ſilver, and ſome other noxious Bodies (which Men have learn'd to make Medicinal) have already taught our Modern Phyſitians; who preſcribe, even in their Diſpenſatories, divers Medicines made out of thoſe churliſh Minerals, to which, in the enſuing Diſcourſes, you will find divers others (perhaps not inferior) added. That *Opium* is reckon'd by Phyſitians among Poiſons, I need not tell you; and yet ſuch powerful Remedies may be made with it for many deſperate Caſes, eſpecially in hot Countries, that the good it may doe, ſo much exceeds the harm, that Phyſitians would be ſorry there were none of it in the World. The Oyl of Scorpions is not onely Antidotal againſt their Stings, but is witneſſed, by experience, to be very uſeful to bring away the deſcending Stone of the Kidneys, and to remedy divers other Miſchiefs, beſides thoſe that Scorpions can doe. And to theſe I ſhall need but to adde one inſtance more, becauſe of the nobleneſſe of that ſingle one, and that is the Root *Mandihoca*, ſo common all over the *Weſt Indies*: for Nature is ſo far from having been a Step-mother to Man in making that Plant abound ſo much in thoſe Countries, though in its crude ſimplicity (as the *Helmontians* ſpeak it be confeſſedly a rank Poiſon, that ſhe hath ſcarce in any one Plant been ſo bountiful to the *Americans*. For by a ſlight and eaſie preparation, which we ſhall hereafter mention, it affords many populous Nations almoſt all the Bread they eat, and ſome of them a good part of their Drink; the Root freed by a ſtrong Preſs from the noxious Juice, and dry'd, affording them that *Caſſavie* Meal, whereof they make their Bread; which by the taſte and colour I could not diſcern to be other then good. Nor is this the onely uſe this Poiſonous Plant affords them: For the above-commended *Piſo* gives us this ſhort, but comprehenſive

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Character of it; *Ex Mandihoca radice maximo scatente veneno, optimum Alimentū non solum, sed & Antidotum concinnatur.* (lib. 3°) But concerning the use that may be made of Poisonous Creatures, we elsewhere professedly discourse: And shall therefore now proceed to observe to you here, that I have not yet mention'd to you the instance which most manifests the greatness of the Good which God intended Man in the Creatures: For, not content to have provided him all that was requisite either to Support or Accommodate him here, he hath been pleas'd to contrive the World so, that (if Man be not wanting to himself) it may afford him not onely Necessaries and Delights, but Instructions too; For each Page in the great Volume of Nature is full of real Hieroglyphicks, where (by an inverted way of Expression) Things stand for Words, and their Qualities for Letters. The Psalmist observes, *That the Heavens declare the glory of God*: And indeed, they celebrate his Praises, though with a soundless Voice, yet with so loud a one (and which gives us the Moral of *Plato*'s exploded notion of the Musick of the Spheres) to our intellectual Ears, that he scruples not to affirm, that *There is no Speech nor Language where their voice is not heard* (or as *Junius* and *Tremellius* render it, without violence to the Hebrew Text, *There is no Speech nor Words; yet without these their Voice is understood*) *and that their Line is gone throughout all the earth*; that is (as the Learned *Diodati* expounds it) their Writing in gross and plain Draughts, and their Words to the end of the World: Their Language having so escap'd the confusion of Tongues, that these Natural and Immortal Preachers give all Nations occasion to say of them, as the Assembly at Pentecost did of the Inspir'd Apostles, *We do hear them speak in our Tongues the wonderful Works of God.*

Psal. 19. 1.

Acts 2. 11.

Nor can we without listning to these Sermons, derive the entire (perhaps not the chiefest) Benefit design'd us in the Creatures: For sure, that God, who hath compos'd us both of Body and Soul, hath not confin'd the uses of so many admi-

rable Creatures, and so much inimitable Workmanship to that ignoble part of Man which coupleth him to the Beasts, with the neglect of that Diviner Portion, which allies him to the Angels; vouchsafing to the Lord of the Creatures, in the fruition of this his Palace, no higher Prerogative then he is pleas'd to allow to the Brutes, that serve but to compleat the variety requisite for its embellishment. Of this Opinion I lately found that excellent Writer, St *Austine*, to have been before me: For, *Non debes uti oculis* (says he) *ut pecus, tantum ut videas, quæ addas ventri, non menti: utere, ut homo, intende Cœlum, & intende Facta, & quære Factorem; aspice quæ vides, & quære quem non vides, crede in eum quem non vides, propter ista quæ vides. Nolite fieri sicut equus & mulus, &c.*

D. *Aug. Hom.* 3. Nor can the Creatures onely inform Man of Gods Being and Attributes (as we have already seen) but also instruct him in his own Duties: For we may say of the World, as St *Austin* did of the Sacraments, that it is *Verbum visibile*. And certainly, God hath never so confin'd himself to instruct Men by Words or Types, as not to reserve himself the liberty of doing it by things: Witness his appointing the Rainbow to Preach his Goodness to all Nations, and fortifie the Faith of Mankinde against the fear of a second Deluge. 'Tis something to high a saying for an Heathen, that of *Plato*, where he teaches, *That the World is Gods Epistle, written to Mankinde.* For by *Solomon* God sends the *Sluggard to school to the Ant*, to learn a provident Industry: Christ commands his Disciples to *learn of Serpents and Pigeons* prudence and inoffensiveness: The same Divine Teacher enjoyns his Apostles *to consider the Lilies*, or (as some would have it) *the Tulips of the Field*, and to learn thence that difficult Virtue of a

1 Cor. 35. 36, 37. distrustless relyance upon God: And St *Paul* seems almost angry with the *Corinthians*, That their Faith, in so abstruse Mysteries as that of the Resurrection, was not inform'd and strengthned, by considering the meliorating death of Corn committed to the Earth: And the Royal Poet learns Humili-

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ty, by the Contemplation of the most elevated parts of Nature; *When I consider* (says he) *the Heavens, the work of thy Fingers, the Moon and Stars which thou hast ordained, What is Man, that thou visitest him?* Thus you may see that God intended the World should serve Man, not onely for a Palace to live in, and to gaze on, but for a School of Virtue; to which his Philanthropy reserves such inestimable Rewards, that the Creatures can, on no account, be so beneficial to Man, as by promoting his Piety, by a competent degree of which, Gods goodness hath made no less then Eternal Felicity attainable. Psal. 8. 3, 4.

ESSAY III.

Containing a Continuation of the Former.

HAving thus, *Pyrophilus*, endeavored to evince, that the Opinion that would deter Men from the ſcrutiny of Nature, is not a little prejudicial to Mans Intereſts, and does very much leſſen the Advantages he may derive from the Creatures, both in relation to his accommodation in this Life, and his Felicity in the next: Let us proceed to conſider, whether the Doctrine we oppoſe do not likewiſe tend, in its own nature (though not in the Intentions of its Patrons) to defeat God of much of that Glory which Man both ought and might aſcribe to him, both for himſelf and the reſt of the Creatures. How unlikely is it that we ſhould be able to offer to God that Glory, Praiſe, and Admiration, he both expects and merits from ſuch a contemplation of the Creatures, as though it be requiſite to the true knowledge of their Nature and Properties, is yet ſuppoſ'd either pernicious, or at leaſt dangerous, You, *Pyrophilus*, or any other impartial Perſon may eaſily determine.

For the Works of God are not like the Tricks of Juglers, or the Pageants that entertain Princes, where concealment is requiſite to wonder; but the knowledge of the Works of God proportions our admiration of them, they participating and diſcloſing ſo much of the inexhauſted Perfections of their Author, that the further we contemplate them, the more Foot-ſteps and Impreſſions we diſcover of the Perfections of their Creator; and our utmoſt Science can but give us a juſter

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veneration of his Omniſcience. And as when ſome Country Fellow looks upon a curious Watch, though he may be hugely taken with the rich Enamel of the Caſe, and perhaps with ſome pretty Landskip that adorns the Dial-plate; yet will not his Ignorance permit him ſo advantageous a Notion of the exquiſite Makers skill, as that little Engine will form in ſome curious Artiſt, who beſides that obvious Workmanſhip that firſt entertains the Eye, conſiders the exactneſs, and knows the uſe of every Wheel, takes notice of their proportion, contrivance, and adaptation altogether, and of the hidden Springs that move them all: So in the World, though every Peruſer may read the exiſtence of a Deity, and be in his degree affected with what he ſees, yet is he utterly unable to deſcry there thoſe ſubtler Characters and Flouriſhes of Omniſcience, which true Philoſophers are ſharp-ſighted enough to diſcern. The exiſtence of God is indeed ſo legibly written on the Creatures, that (as the Scripture ſpeaks in another ſenſe) Habb. 2. 2. *He may run that reads it*; that is, even a perfunctory Beholder, that makes it not his buſineſs, may perceive it. But that this God has manifeſted in theſe Creatures a Power, a Wiſdom, and a Goodneſs worthy of himſelf, needs an attentive and diligent Surveyor to diſcover. How different notions of Gods Wiſdom do the Eggs of Hens produce in the ordinary Eaters of them, and in curious Naturaliſts, who carefully watch and diligently obſerve from time to time the admirable progreſs of Nature in the Formation of a Chick, from the firſt change appearing in the *Cicatricula* (or little whitiſh ſpeck diſcernable in the Coat of the Eggs Yolk) to the breaking of the Egg-ſhell by the perfectly hatched Bird, and on Natures exquiſite method in the order and faſhioning of the parts, make ſuch Philoſophical reflections as you may meet with (not to mention what *Ariſtotle* and *Fabricius ab Aquapendente*, have obſerved on that ſubject) in the Ingenious Treatiſe of Generation, which our accurate and juſtly Famous Anatomiſt, Dr *Highmore*, has been pleaſed to Dedicate to me; and in the excellent Exercitations,

tions, *De Ovo*, of that great Promoter of Anatomical Knowledge, Dr *Harvey*. And whereas it may be alledg'd, That the Attributes of God, which are not taught us, but after much speculation of the World, are things of which no Man but an Atheist doubts; to this it may be reply'd, That besides that, it ill becomes the sense we ought to have of our weakness to despise any helps vouchsaf'd us of God to assist us to know or serve him; besides this, I say, God loving, as he deserves, to be honor'd in all our Faculties, and consequently to be glorifi'd and acknowledg'd by the acts of Reason, as well as by those of Faith, there must be sure found a great disparity betwixt that general, confus'd, and lazy Idea we commonly have of his Power and Wisdom, and the distinct, rational, and affecting notions of those Attributes which are form'd by an attentive inspection of those Creatures in which they are most legible, and which were made chiefly for that very end. The Queen of *Sheba* had heard in her own Country a very advantageous Fame of the Wisdom of *Solomon*; but when the curiosity of a personal Visit made her an Eye-witness of those particular both exquisite Structures, and almost Divinely prudent Conducts and Contrivances wherein that Wisdom did inimitably display it self, she then brake forth into Pathetick and Venerating Exclamations, that acknowledg'd how much juster and improved a Character (of his Wisdom) her Eyes had now given her, then formerly her Ears had done.

Very like a Philosopher, methinks, does the Great *Mercurius Trismegistus* (if we grant him to be the Author of the Books ascribed to him) speak, when he tells his Son, *There can be no Religion more true or just, then to know the things that are, and to acknowledge thanks for all things to him that made them; which thing I shall not cease to do*: (he continues) *Be Pious and Religious, O my Son! for he that does so is the best and highest Philosopher; and without Philosophy it is impossible ever to attain to the height and exactness of Piety and Religion.* And 'twas perhaps, *Pyrophilus*, to ingage us to an in-

Merc. Trism. lib. 1. Englished by Dr. *Everard.*

industrious

induſtrious indagation of the Creatures, that God made Man ſo indigent, and furniſh'd him with ſuch a multiplicity of Deſires; ſo that whereas other Creatures are content with thoſe few obvious and eaſily attainable neceſſaries, that Nature has almoſt every where provided for them; In Man alone, every ſenſe has ſtore of greedy Appetites, for the moſt part of Superfluities and Dainties, that to relieve his numerous Wants, or ſatisfie his more numerous Deſires, He might be oblig'd with an inquiſitive Induſtry to Range, Anatomize, and Ranſack Nature, and by that concern'd ſurvey come to a more exquiſite Admiration of the Omniſcient Author. To illuſtrate this ſubject yet a little further, *Pyrophilus*, give me leave to obſerve to you, That Philoſophers of almoſt all Religions have been, by the contemplation of the World, mov'd to conſider it under the notion of a Temple: *Ne adoremus* (ſays *Plutarch*) *Elementa, Cœlum, Solem, Lunam, &c. ſpecula ſunt hæc, in quibus artem illius ſingularem intueamur, qui mundum condidit, & adornavit; nec eſt aliud Mundus quam Templum ejus*: *Let us not venerate the Elements, the Heaven, the Sun, the Moon*, &c. *theſe are but* Miroirs, *wherein we may behold his excellent Art, who fram'd and adorn'd the World; nor is the World any thing elſe but his Temple*: *Homines* (ſays *Cicero*) *tuentur illum Globum, quem in Templo hoc medium vides, qui terra dicitur*: *Men abide upon that Globe which you ſee in the middle of this Temple, and is called the Earth*; which *Macrobius* handſomely thus expounds: *Quicquid humano aſpectui ſubjicitur, Templum ejus vocavit qui ſolâ mente concipitur, ut qui hæc veneratur ut templa, cultum tamen maximum debeat Conditori, ſciatq; quiſquis in uſum Templi hujus inducitur, ritu ſibi vivendum ſacerdotis*: *All that humane view reaches, he terms his Temple, who is apprehended by the minde alone; to the end that who ſo revcrences theſe things as Temples, might render the greateſt worſhip to the Maker; and every one that is brought to converſe in this Temple, might know himſelf oblig'd to live like a Prieſt.*

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And the Lofty *Seneca* (to mention now no other Heathens) in divers paſſages of his excellent Writings, ſtiles the World a Temple; and I remember in his Treatiſe, *De Beneficiis*, he avers in terms not unworthy his Mind or his Subject, *Totum mundum Deorum eſſe immortalium Templum, ſolum quidem amplitudine illorum ac magnificentiâ dignum. That the whole World is the Temple of the immortal Gods, being alone worthy of their Grandeur and Magnificence.* The aſſent of the Jewiſh Philoſophers, to this Notion, you may be pleaſed to receive from their Eloquent *Philo*, who not only gives the World the Name of Temple, but gives us this account of that appellation; *Templum Dei ſupremum & verè tale exiſtimare totum hunc mundum, qui ſacrarium quidem habet, puriſſimam rerum naturæ partem, Cœlum; ornamenta, ſtellas; ſacerdotes, adminiſtros potentiæ ejus, Angelos, & incorporeas animas. The whole World is to be accounted the chiefeſt Temple of God; the* Sanctũ Sanctorũ *of it is the pureſt part of the Univerſe, Heaven; the ornaments, the Stars; the Prieſts, the Miniſters of His Power, Angels, and immaterial Souls.* And as for Chriſtian Philoſophers, I ſuppoſe it would be needleſſe to enumerate the paſſages wherein they adapt the Notion of the World already mention'd; and therefore I ſhall content my ſelfe to adde, that the Scripture it ſelfe ſeems to Authoriſe it by repreſenting to us in the 8th and 9th Chapters of the Epiſtle to the Hebrews, the Moſaical Tabernacle, as an adumbration of that Great Temple of the World; and particularly there is a ſignal Text in the latter of thoſe Chapters, where it is ſaid that Chriſt is not enter'd into Holy places made with Hands [χειροποίητα ἅγια] which are copies of the true [ἀντίτυπα τῶν ἀληθινῶν] but into Heaven it ſelfe, now to appeare in the preſence of God for us.

Sen. li. 7. cap. 7.

Philo Jud. de Monarchia.

Heb. 8. 2, 5.

Heb. 9. 24.

Upon what account, *Pyrophilus*, I eſteem the World a Temple, I may elſewhere have occaſion to Declare; but this for the preſent: It will not be raſh to infer that if the World be a Temple, Man ſure muſt be the Prieſt, ordain'd (by being

qualifi'd) to celebrate Divine Service not only in it, but for it. For as in Schools, when the Prince or some munificent Benefactor confers some large possession or rich annuity upon the Foundation, though all the Boyes be concern'd in the benefit, yet because most of them are too young to be sensible of it, or too unlearned to be able to make the retribution of a handsome acknowledgment, either the Master or that other person of the Society, who is most capable and the best spoakesman, is by a kind of natural right engag'd to the duty of returning praise and thanks, not for himself alone, but in the name of all the rest: So in the World, where there are so many inanimate and irrational Creatures, that neither understand how much they owe to their Creator, by owing him even themselves, nor are born to a condition inabling them to acknowledg it; Man, as born the Priest of Nature, and as the most oblig'd and most capable member of it, is bound to returne Thanks and Praises to his Maker, not only for himselfe but for the whole Creation. In which sense we may reconcile those two current Assertions, *That God made all things for His own Glory, and that God made all things for Man, and Man for himselfe.* Since whether or no Man be a Microcosme or Little World in *Paracelsus's* sense, if not as a resembler, yet as a representer of the Macrocosme or Great World, he presents with his own adorations the Homages of all the Creatures to their Creator, though they be ignorant of what is done, as Infants under the Law were of the sacrifices offered on their account. And in this Relation may the Creatures answer the Solemn invitation made them in the whole 148 *Psalm*, and numerous other Scriptures: which they may do (to borrow a barbarous but significant Schoolterme) objectively, though not formally; I mean, by proving occasions, though not singers of his praises, and being such objects as prompt and invite Man to pay God that praise upon their score, which they cannot actually pay him themselves; even God's muteſt works being capable of being said

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to praise him in the same sense (though in an incomparably transcendenter degree) that *Solomon* saies of his virtuous Woman (in the last Verse of the Proverbs) *Let her own VVorks praise her in the Gates*; that is, give the considerers of them occasion to extol her: and thus by man's referring the knowledg of the Creature to the Creator's Glory, it becomes in some sense, and congruously to its own Nature, the praiser of its Maker, as may seem intimated in this OEconomy of the Last part of one of the *Psalmes*, *Blesse the Lord, all ye His Hosts, the Ministers of His that do His pleasure. Blesse the Lord, all His VVorks, in all places of His Dominion: Blesse the Lord, O my soule.* Where by shutting up the rest of God's Creatures betwixt Angels and Man's Soule, he seems to insinuate that the irrational Creatures blesse the Lord by the mouth of those that are Intelligent.

Prov. 31. 31.

Ps. 103.

And truly, *Pyrophilus*, I fear it may relish a little of selfishnesse, to make such a disparity betwixt Perfections, all of them equal, because all of them infinite, as to let God's mercy, because it most advantages us, so to ingrosse our thoughts, and wonder, as to make us neglect the contemplation of those other Glorious Attributes, his Power and his VVisdome, which were those that exacted both Man and Angels adoration, before sin gave occasion to the exercise of the first. And I shall not scruple to confesse unto you, that I dare not confine the Acts of Devotion to those which most men suppose to comprise the whole exercise of it; not that I at all undervalue, or would depreciate any, even the meanest practises of Devotion, which either Scripture or reason consonant to it recommends; but that I esteem that God may be also acceptably (and perhaps more nobly) serv'd and glorifi'd by our entertaining of high, rational, and as much as our nature is capable of worthy notions, attended with a profound and proportionable admiration of those divine Attributes and Prerogatives for whose manifesting he was pleas'd to construct this vast Fabrick.

To which purpose I consider, that in the Life to come, when we shall questionless glorifie God exactliest, we shall have little either need or use of Faith, Prayer, Liberality, Patience, and resembling Graces; but our Worship will chiefly consist in elevated Notions, and a prostrate Veneration of Gods Omnipotence, Wisdom, Goodness, and other Perfections; and such a one as this is represented in the *Apocalyps*, to be the present employment of the Blest Spirits in Heaven, where the Elders that assist about the Throne of God, are describ'd, casting their Crowns before it, and saying to him that sits on it, *Thou art worthy, O Lord, to receive Glory, and Honor, and Power: for thou hast created all things, and for thy pleasure they are and were created.*

Rev. 4. 11.

By this time, *Pyrophilus*, I hope you begin to think, that the Doctrine that tends to deter Men from enquiring into Nature, is as well derogatory from Gods Glory, as prejudicial to Mans Interests. And indeed, I purpos'd to content my self with the having dispers't throughout the past Discourse, the grounds of answering their Objection against the study of Physiology, who pretend it is apt to make Men Atheists: But because I am much concern'd to have you satisfied of so important a Truth, as that which we have hitherto been laboring to evince, I must beg your leave, *Pyrophilus*, to adde *ex abundanti* (as they speak) to what has been already alledg'd, some things that may more directly answer the Objection of our Adversaries, and manifest how little their severity is befriended, either by Scripture, Reason, or Experience.

And first, it seems not at all probable, That if the Omniscient Author of Nature knew that the study of his Works did really tend to make Men dis-believe his Being or Attributes, he would have given Men so many Invitations, and almost Necessities, to study and contemplate the Nature of his Creatures: Of these Invitations divers have been mention'd already, and more might be added to them, if we thought it requisite. But what has been above alledg'd, will make us

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forbear the annexing of any, save that of the ancient Institution of the Sabbath, which many eminent Divines do not groundlesly hold to have been ordain'd to commemorate the Creation, and give Men the opportunity every Seventh Day to contemplate God in his Works, as he himself was pleas'd to rest on the first Seventh Day, and contemplate Himself in the works of the first six. And though our Western Churches, for certain Reasons (not here to be inquir'd into) have long since disus'd the Solemnizing of the Saturday, and appointed the Sunday for the Celebration of both the Works of the Redemption, and Creation of the World together; yet 'tis evident enough that the Primitive Christians did for the most part keep the Saturday as Holy-day, as well as the Sunday: For that ancient Book (whoever be resolv'd to have written it) which goes under the Name of *Clement's Constitutions*, affords us, among others, these two memorable Passages to our purpose: And first, Τὸ Σάββατον μέν τοι (says he) καὶ κυριακὴν ἑορτάζετε· ὅτι τὸ μὲν δημιουργίας ἐστὶν ὑπόμνημα ἥδε ἀναστάσιος. *Keep the Sabbath and the Lords Day as Holy-days; that being dedicated to the remembrance of the Creation, and this to that of the Redemption*: To which we shall adde this second Passage of the same Author, Ἐργαζέσθωσαν οἱ δοῦλοι, &c. *Let Servants work for five days; but on the Sabbath, and the Lords-day, let them attend in the Church the Doctrine of Godlineſs.* To which purpose, I remember the most Learned *Grotius* observes, That the converted Emperor *Constantine*, forbad the compelling Christians to appear before Tribunals on either of those Days, as being their Festivals: Nay, and if Modern Travellers do not misinform me, I finde that divers of the Eastern Churches, particularly the *Abyssine* Christians, to this day do as well sanctifie the Sabbath-day in commemoration of Gods having created the World, as the Lords-day to commemorate the Resurrection of Christ. And as for the Jews sense of the Fourth Commandment, some of the Learnedst of their Criticks are pleas'd to distinguish betwixt the Words *Zachôr* and *Smôr*,

Lib. 7. cap. 24.

See of the *Abyssine* or *Æthiopian* Christians; and likewise of the *Maronites* in the East, in reference to their Celebration of the Saturday, *Alex. Rosse* in his view of all Religions, and the Authors by him cited.

Smôr, *Remember* and *Keep*, imploy'd in the Command of ſolemnizing the Sabbath: For, the remembring of it they hold to be an act of Religion, performable by all Man-kinde that are capable of it, and acquainted with its having been commanded; though the keeping of it Holy they ſuppoſe onely enjoyn'd to the *Iſraelites*: On which occaſion, I remember I was one Sabbath-day entertain'd at his own Lodgings, by a Learned Jew (who taught me the Holy Language) with Meat then newly dreſſ'd: to remove my wonder at which, he told me, *That it was dreſſ'd by Chriſtians, who, being Gentiles, were not oblig'd to the ſtrict and legal obſervation of the Sabbath.* But whatever be to be thought of this Jewiſh Notion, yet queſtionleſs if the Fourth Commandment do not, at leaſt, divers other Paſſages of Scripture do much diſcountenance their ſeverity, who would fright Men from the indagation of Nature. And he that ſhall duly conſider divers Texts obvious enough in the Book of *Job*, and the *Pſalms* (beſides other parts of the Bible) will not readily conclude, that Natural Philoſophy and Divinity are at ſuch variance, as the Divines we deal with would perſwade us. St *Paul* ſeems to inform us, that the inviſible things of God from the Creation of the World, are clearly ſeen, being underſtood by the things that are made, even *his eternal Power and God-head*: So that they that were mention'd before are without excuſe. And though I ignore not, that not onely ſeveral of the *Socinians* following their Maſter *Socinus*, but ſome few Orthodox Writers, are pleaſ'd to give a very differing Interpretation of that Text, and make the ἀόρατα αὐτοῦ ἀπὸ κτίσεως κόσμου to ſignifie thoſe things of God that have been Inviſible ever ſince the Creation of the World, and referring the ποιήματα *to things not made*, as we Tranſlate it, *but done* (as the Miracles of Chriſt and his Apoſtles) yet I ſee no neceſſity why the ποιήματα ſhould be taken in a ſenſe excluſive of the Creation, and not at leaſt admitted to take in all the Ways and Methods imployed by God to manifeſt the *inviſible things* there intimated unto Man:

Rom. 1. 20.

And

And certainly, however St *Paul* may be ſuppoſ'd to appear but darkly, yet *Job* was clearly of a differing Opinion from theirs, who teach, *That the ſtudy of Nature leads to Atheiſm*: *For ask now the Beaſts* (ſays he) *and they will teach thee, and the Fowls of the Air, and they ſhall tell thee: or ſpeak to the Earth, and it ſhall teach thee, and the Fiſhes of the Sea ſhall declare unto thee. Who knoweth not in all theſe that the hand of the Lord hath wrought this?* And conſonantly hereunto (which 'twere not amiſs for our Adverſaries to take notice of) we may obſerve, That almoſt all the Writers of Natural Theology, and the moſt alſo of thoſe that have labored to demonſtrate the Truth of Chriſtian Religion (divers of whom have been as well Profound Divines, as otherwiſe Eminent Scholars) have undertaken to evince, by the conſideration of the Univerſe, both that there is a God, and that he is the Author of it: Which I the rather mention, *Pyrophilus*, becauſe I would not be miſtaken, as if I diſputed againſt Divines in general, or were guilty of the leaſt Irreverence towards a Faculty, in whoſe Study I have thought my ſelf oblig'd, as a Chriſtian, to ſpend much of my time; and eſpecially, I would not appear diſ-reſpectful to Divines in *England*, where they have already been but too much vilified, though queſtionleſs for their Sins againſt God, yet, I fear, not without the Sin of their Oppreſſors. Job 12. 7,8,9.

In the next place I conſider, That ſince Phyſiology is ſaid to tempt to Atheiſm, but by enabling Men to give an account of all the *Phænomena* of Nature, by the knowledge of Second Cauſes, without taking in the Firſt, it will not be ſo eaſie a matter as many preſume, for the contemplation of Nature, to turn a conſidering Man Atheiſt. For we are yet, for ought I can finde, far enough from being able to explicate all the *Phænomena* of Nature by any Principles whatſoever. And even of the Atomical Philoſophers, whoſe Sect ſeems to have the moſt ingeniouſly attempted it, ſome of the

the eminenteſt have themſelves freely acknowledged to me, their being unable to do it convincingly to others, or ſo much as ſatisfactorily to themſelves. And indeed, not onely the Generation of Animals is a Myſtery, which all that Naturaliſts have ſaid to explain it, hath been far enough from depriving of that Name; but we ſee that to explicate all the various *Phænomena* that belong to that ſingle inanimate, and ſeemingly homogeneous Body, *Mercury*, ſo as not to make any *Hypotheſis* aſſum'd to make out one of its Properties or Effects incongruous to any other *Hypotheſis* requiſite to the explanation of any of the reſt, hath been hitherto found ſo difficult, that if our Poſterity be not much happier Unriddlers, then our Fore-Fathers, or we have been, it is like to prove a Task capable of defeating the Induſtry and Attempts, I ſay not of more then one Philoſopher, but of more then one Age; even our Chymical Tortures hitherto, having, from that deluding *Proteus*, forc'd no Confeſſions that bring us not more Wonder then Satisfaction, and do not Beget almoſt as many Scruples as they Reſolve.

ESSAY

ESSAY IV.

Containing a requisite Digression concerning those that would exclude the Deity from intermedling with Matter.

I Ignore not that not onely *Leucippus*, *Epicurus*, and other *Atomists* of old, but of late some Persons, for the most part Adorers of *Aristotle*'s Writings, have pretended to be able to explicate the first *Beginning of Things*, and the Worlds *Phænomena*, without taking in, or acknowledging any Divine Author of it: And therefore, though we may elsewhere, by the assistance of that Author, have an opportunity to give You an Account of our unsatisfiedness with the Attempts made by some bold Wits in favor of such Pretensions; Yet since the main Truth We plead for, in this Discourse, is so nearly concern'd in what hath been taught by those that would keep God from being thought to have any share in the Production of the Universe; I can scarce forbear (as unwilling as I am to digress) to represent to You, on the present occasion, a few Considerations which may assist You, if not to lessen the Arrogance of such Persons, at least, to keep Your self from thinking their Evidence as great as their Confidence is wont to be. Now of the Philosophers we speak of, some being Atomists, and others not, it will be requisite to say something to each of the two sorts: And because we not long since, in an Illustrious Company, where You, *Pyrophilus*, are not unknown, met with one of them, who avowedly grounded his Opinions on the *Aristotelean* or vulgar Physiology, We

ſhall firſt recommend to You two or three Conſiderations concerning ſuch arrogant Peripateticks (For I ſpeak not of that Sect in general, of which I know there are divers excellent Men.)

Firſt then, You will in many Paſſages of the following Eſſays, finde, that divers things that have been very Magiſterially taught, and confidently believ'd among the Followers of *Ariſtotle*, are Errors or Miſtakes; and that as ſeveral, even of the obvious *Phænomena* of Nature, do contradict the common Peripatetick Doctrine, ſo divers, at leaſt of thoſe that are more abſtruſe, are not explicable by it; and as confidently as theſe his Followers talk of the expounding the very Riddles of Nature; yet I remember that he himſelf ſomewhere (for I cannot call to minde the place) did not ſcruple to confeſs, that *As the Eyes of Owls are to the ſplendor of the Day, ſo are thoſe of our Minds even to things obvious and manifeſt.*

I ſhall next take notice, That Philoſophers, who ſcorn to aſcribe any thing to God, do often deceive themſelves, in thinking they have ſufficiently ſatisfied our Enquiries, when they have given us the neareſt and moſt immediate cauſes of ſome things; whereas oftentimes the aſſignment of thoſe Cauſes is but the manifeſting that ſuch and ſuch Effects may be deduc'd from the more Catholick affections of things, though theſe be not unfrequently as abſtruſe as the *Phænomena* explicated by them, as having onely their Effects more obvious, not their Nature better underſtood: As when, for inſtance, an account is demanded of that ſtrange ſuppoſed Sympathy betwixt Quick-ſilver and Gold; in that we finde, that whereas all other Bodies ſwim upon Quick-ſilver, it will readily ſwallow up Gold, and hide it in its Boſom. This pretended Sympathy the Naturaliſt may explicate, by ſaying, That Gold being the onely Body heavier then Quick-ſilver of the ſame bulk, the known Laws of the *Hydroſtaticks* make it neceſſary, that Gold ſhould ſink in it, and all lighter Bodies ſwim on it: But though the cauſe of this Effect be thus plauſibly aſſign'd,

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by deducing it from ſo known and obvious an affection of Bodies, as Gravity, which every man is apt to think he ſufficiently underſtands; yet will not this put a ſatisfactorie period to a ſevere Inquirers Curioſitie, who will, perchance, be apt to alledge, That though the Effects of Gravity indeed be very obvious, yet the Cauſe and Nature of it are as obſcure as thoſe of almoſt any *Phænomenon* it can be brought to explicate. And that therefore he that deſires no further account, deſiſts too ſoon from his Enquiries, and acquieſces long before he comes to his Journies end. And indeed, the inveſtigation of the true nature and adequate cauſe of gravity, is a task of that difficulty, that in ſpight of ought I have hitherto ſeen or read, I muſt yet retain great doubts whether they have been clearly and ſolidly made out by any Man. And ſure, *Pyrophilus*, there are divers Effects in Nature, of which, though the immediate Cauſe may be plauſibly aſſign'd, yet if we further enquire into the Cauſes of thoſe Cauſes, and deſiſt not from aſcending in the Scale of Cauſes till we are arriv'd at the top of it, we ſhall perhaps finde the more Catholick and Primary cauſes of Things, to be either certain, primitive, general and fix'd Laws of Nature (or rules of Action and Paſſion among the parcels of the Univerſal Matter) or elſe the Shape, Size, Motion, and other primary Affections of the ſmalleſt parts of Matter, and of their firſt Coalitions or Cluſters: eſpecially thoſe endowed with ſeminal Faculties or Properties, or (to diſpatch) the admirable conſpiring of the ſeveral parts of the Univerſe to the production of particular Effects; of all which it will be difficult to give a ſatisfactory Account, without acknowledging an intelligent Author or Diſpoſer of Things.

Phyſiologo qui veritatem contemplatur ultimarum cauſarum cognitio non finis eſt, ſed initiũ ad primas ſupremaſque cauſas proficiſcendi. Plutarch: lib. de primo Frigido.

Τὸ πρῶτον αἴτιον ἐστὴ εὕρησει ἔσχατον. *Ariſtot. Ethic. Nicom. lib.* 3. *cap.* 8.

And the better to clear ſo weighty a Truth, let us further conſider on this occaſion, That not onely *Ariſtotle*, and thoſe that, miſ-led by his Authority, maintain the Eternity of the World, but very many other Philoſophers and Phyſitians, who aſcribe ſo much to Nature, that they will not be reduc'd to acknowledge an Author of it, are wont very much to delude

both themſelves and others in the account they preſume to give us, as ſatisfactory of the Cauſes or Reaſons of very many Effects: I will not inſtance in the Magnetick Properties of Things, nor any of thoſe numerous abſtruſities of Nature, which 'tis well known that the *Ariſtoteleans* are wont to refer to Sympathy, Antipathy, or Occult Qualities, and ſtrive to put Men off with empty Names, whereby they do not ſo much leſſen our Ignorance, as betray their own.

But I ſhall inſtance in thoſe more obvious *Phænomena*, of which they ſuppoſe they have given us very ſatisfactory Accounts: If you ask one of thoſe I ſpeak of, whence it comes to paſs that if a Man put one end of a long Reed into a Veſſel full of Water, and ſuck at the other end, his Mouth will be immediatly fill'd with that Liquor; he will readily tell you, That the Suction drawing the Air out of the cavity of the Reed, the Water muſt neceſſarily ſucceed in the place deſerted by the Air, to prevent a Vacuity abhorr'd by Nature. If you likewiſe ask ſuch a Man, Why to Women about a certain Age, their *Purgationes Menſtruæ* do commonly ſupervene, he will think he has ſufficiently anſwered you, when he has told you, that about that Age, beginning to beripe for Procreation, Nature has wiſely provided that their ſuperfluous Blood ſhould be ſent to the Uterine Veſſels, partly to diſ-burthen the Maſs of Blood of an uſeleſs load, and partly to contribute Matter, or at leaſt afford Nouriſhment in caſe of Conception. But though theſe Solutions are wont to be acquieſc'd in by ſuch as thoſe that give them, yet I ſee not how they can ſatisfie a rigid Reaſoner. For not now to mention what may be objected againſt them out of ſome Modern Mechanical and Anatomical Obſervations, let us a little conſider, that to ſay that the aſcent of the Water in the firſt Problem, proceeds from Natures Deteſtation of a Vacuity, ſuppoſes that there is a kinde of *Anima Mundi*, furniſhed with various Paſſions, which watchfully provides for the ſafety of the Univerſe; or that a Brute and Inanimate Creature, as Water, not onely has a power to move

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its heavy Body upwards, contrary (to speak in their Language) to the tendency of its particular Nature, but knows both that Air has been suck'd out of the Reed, and that unless it succeed the attracted Air, there will follow a *Vacuum*; and that this Water is withal so generous, as by ascending, to act contrary to its particular inclination for the general good of the Universe, like a Noble Patriot, that sacrifices his particular Interests to the publick ones of his Countrey.

But to shew Men by an easie Experiment how little Attraction is perform'd to avoid a *Vacuum*, I have sometimes done thus; I have taken a slender Pipe of Glass, of about four Foot long, and putting one of the open ends of it into a Vessel full of Quick-silver, I have suck'd as stronly as I could at the other, and caus'd one to watch the ascent of the Quick-silver, and mark where it was at the highest, and I found not that at one suck, I could raise it up much above a Foot; and having caus'd a couple of strong Men, one after another, to suck at the same end of the same Pipe, I found not that either of them could draw it up much higher. Nor did it appear that by repeated Suctions, though the upper end of the Pipe were each time stopp'd, to hinder the relapse of the Quick-silver, it could at all be rais'd above the seven and twenty Digits at which it us'd to subsist in the *Torrecellian* Experiment *De Vacuo*: Whereas the same end of that Tube being put into a small Vessel of Water, I could at one suck make the Water swiftly ascend thorow the perpendicularly held Tube into my Mouth, which argues, that the ascension of Liquors upon Suction, rather depends upon the pressure of the Air, and their respective measures of Gravity and Lightness compar'd to that Pressure, then it proceeds from such an abhorrency of a *Vacuum* as is presum'd.

And so likewise in the other Question propos'd, it is imply'd, that there is in a Female Body something, that knows the rule of Physitians, that of a *Plethora*, the Cure is the convenient Evacuation of Blood, and that this intelligent Faculty is wise enough

nough also to propose to it self the double end above-mentioned, in this Evacuation, and therefore will not provide a Quantity of Blood great enough to require an Excretion, nor begin it till the Female be come to an Age wherein 'tis possible for both the Ends to be obtain'd; & that also this presiding Nature is so charitable, as that Man-kinde might not fail, it will make the Female subject to such Monethly Superfluities of Blood, from which Experience informs us, that a whole Set of Diseases peculiar to that Sex, does frequently proceed. And in a word, there is a multitude of Problems, especially such as belong to the use of the Parts of a humane Body, and to the Causes and Cures of the Diseases incident thereunto, in whose Explication those we write of, content themselves to tell us, That Nature does such and such a thing, because it was fit for her so to do; but they endeavor not to make intelligible to us, what they mean by this Nature, and how meer, and consequently bruit, Bodies can act according to Laws, and for determinate Ends, without any knowledge either of the one or of the other. Let them therefore, till they have made out their *Hypotheses* more intelligibly, either cease to ascribe to irrational Creatures such Actions as in Men are apparently the Productions of Reason and Choice, and sometimes even of Industry and Virtue; or else let them with us acknowledge, that such Actions of Creatures in themselves Irrational, are perform'd under the superintendence and guidance of a Wise and Intelligent Author of Things. But that you may not mistake me, *Pyrophilus*, it will be requisite for me, to acquaint you in two or three words with some of my present thoughts concerning this subject: That there are some Actions so peculiar to Man, upon the account of his Intellect and Will, that they cannot be satisfactorily explicated after the maner of the Actings of meer corporeal Agents, I am very much inclin'd to believe: And whether or no there may be some Actions of some other Animals, which cannot well be Mechanically explicated, I have not here leisure or opportunity to examine.

But

But for (most of) the other *Phænomena* of Nature, methinks we may, without absurdity, conceive, That God, of whom in the Scripture 'tis affirm'd, *That all his Works are known to him from the Beginning*; having resolved, before the Creation, to make such a World as this of Ours, did divide (at least if he did not create it incoherent) that Matter which he had provided into an innumerable multitude of very variously figur'd Corpuscles, and both connected those Particles into such Textures or particular Bodies, and plac'd them in such Scituations, and put them into such Motions, that by the assistance of his ordinary preserving Concourse, the *Phænomena*, which he intended should appear in the Universe, must as orderly follow, and be exhibited by the Bodies necessarily acting according to those Impressions or Laws, though they understand them not at all, as if each of those Creatures had a Design of Self-preservation, and were furnish'd with Knowledge and Industry to prosecute it; and as if there were diffus'd through the Universe an intelligent Being, watchful over the publick Good of it, and careful to Administer all things wisely for the good of the particular Parts of it, but so far forth as is consistent with the Good of the whole, and the preservation of the Primitive and Catholick Laws established by the Supreme Cause. As in the formerly mention'd Clock of *Strasburg*, the several Pieces making up that curious Engine, are so fram'd and adapted, and are put into such a motion, that though the numerous Wheels, and other parts of it, move several ways, and that without any thing either of Knowledge or Design; yet each performs its part in order to the various Ends for which it was contriv'd, as regularly and uniformly as if it knew and were concern'd to do its Duty; and the various Motions of the Wheels, and other parts concur to exhibit the *Phænomena* design'd by the Artificer in the Engine, as exactly as if they were animated by a common Principle, which makes them knowingly conspire to do so, and might, to a rude Indian, seem to be more intelligent then

Acts 15. 18.

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Cunradus Dasypodius himself, that published a Description of it, wherein he tells the World, That he contrived it, who could not tell the hours and measure time so accuratly as his Clock. And according to this Notion, if you be pleas'd to bear it in your memory, *Pyrophilus*, you may easily apprehend in what sense I use many common Phrases, which custom hath so authorized, that we can scarce write of Physiological subjects without employing either them, or frequent and tedious Circumlocutions in their stead: Thus when I say, that a stone endeavors to descend towards the Centre of the Earth, or that being put into a Vessel of Water, it affects the lowest place: I mean that not such a Mathematical Point as the Centre of the Earth, hath power to attract all heavy Bodies, the least of which, it being a point, it cannot harbor; or that a Stone does really aim at that unknown and unattainable Centre; but that, as we say, that a Man strives or endeavors to go to any place, at which he would quickly arrive, if he were not forcibly hindered by some Body that holds him fast where he is, and will not let him go: So a Stone may be said to strive to descend, when either by the Magnetical Steams of the Earth, or the pressure of some subtle Matter incumbent on it, or by what ever else may be the cause of Gravity, the Stone is so determined to tend downwards, that if all Impediments, interpos'd by the Neighboring Bodies, were removed, it would certainly and directly fall to the ground; or being put into a Vessel with Water, or any other Liquor much less heavy then it self (for on Quick-silver, which is heavier, Stones will swim) the same Gravity will make it subside to the bottom of the Vessel, and consequently thrust away its bulk of Water, which though heavy in it self, yet because it is less ponderous then the Stone, seems to be light. And so in our late instance in the Clock, if it be said that the Hand that points at the Hours affects a circular motion, because it constantly moves round the Centre of the Dial-plate, 'tis evident that the inanimate piece of Metal affects not that motion more then any other, but onely that the im-

impression it receives from the Wheels, and the adaptation of the rest of the Engine, determine it to move after that manner. And although if a Man should with his Finger stop that Index from proceeding in its course, it may be said, in some sense, that it strives or endeavors to prosecute its former Circular Motion; yet that will signifie no more, then that by virtue of the Contrivance of the Engine, the Index is so impell'd, that, if the Obstacle, put by the Finger of him that stops it, were taken away, the Index would move onwards, from that part of the Circle where it was stopt, towards the mark of the next Hour. Nor do I by this, *Pyrophilus*, deny that it may in a right sense be said, as it is wont to be in the Schools, that *Opus Naturæ est opus Intelligentiæ*: Neither do I reject such common Expressions as *Nature always affects and intends that which is best*, and *Nature doth nothing in vain*. For since I must, according to the above-mention'd Notion, refer many of the actions of irrational Creatures to a most wise Disposer of Things, it can scarce seem strange to me, that in those particulars in which the Author intended, and it was requisite that irrational Creatures should operate so and so for their own Preservation, or the Propagation of their Species, or the publick good of the Universe, their Actions being ordered by a Reason transcending Ours, should not onely oftentimes resemble the Actings of Reason in Us, but sometimes even surpass them. As in effect we see that Silk-worms and Spiders can, without being taught, spin much more curiously their Balls and Webs, then our best Spinsters could; and that several Birds can build and fasten their Nests more Artificially then many a Man, or perhaps any Man could frame and fasten such little and elaborate Buildings. And the Industries of Foxes, Bees, and divers other Beasts, are such, that 'tis not much to be wondered at that those Creatures should have Reasons ascrib'd to them by divers Learned Men, who yet perhaps would be less confident, if they considered how much may be said for the Immortality of all rational Souls. And that the

ſubtle Actings of theſe Beaſts are determined to ſome few Particulars requiſite for their own Preſervation, or that of their Species; whereas on all other occaſions, they ſeem to betray their want of Reaſon, and by their Voice and Geſtures ſeem to expreſs nothing, but the Natural Paſſions, and not any Rational or Logical Conceptions. And therefore, as when (to reſume our former compariſon) I ſee in a curious Clock, how orderly every Wheel and other part performs its own Motions, and with what ſeeming Unanimity they conſpire to ſhew the Hour, and accompliſh the other Deſigns of the Artificer, I do not imagine that any of the Wheels, *&c.* or the Engine it ſelf is endowed with Reaſon, but commend that of the Workman who fram'd it ſo Artificially. So when I contemplate the Actions of thoſe ſeveral Creatures that make up the World, I do not conclude, the inanimate Pieces, at leaſt, that 'tis made up of, or the vaſt Engine it ſelf, to act with Reaſon or Deſign, but admire and praiſe the moſt wiſe Author, who by his admirable Contrivance can ſo regularly produce Effects, to which ſo great a number of ſucceſſive and conſpiring Cauſes are requir'd.

And thus much, *Pyrophilus*, having been repreſented concerning thoſe, that rejecting from the Production and Preſervation of Things, all but Nature, yet imbrace the Principles of the vulgar Philoſphy, you will perhaps think it more then enough: but Object, That what is not to be expected from the barren Principles of the Schools, may yet be perform'd by thoſe Atomical ones which we our ſelves have within not very many Pages ſeem'd to acknowledge Ingenious. And I know indeed, that the modern Admirers of *Epicurus* confidently enough pretend, that he and his Expoſitors have already, without being beholding to a Deity, clearly made out, at leaſt the Origine of the World, and of the principal Bodies 'tis made up of: But I confeſs, I am ſo far from being convinc'd of this, that I have been confirm'd rather, then unſetled in my Opinion, of the difficulty of making out the Original of the World,

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and of the Creatures, especially the living Ones that compose it, by considering the accounts which are given us of the Nativity (if I may so speak) of the Universe, and of the Animals, by those great Denyers of Creation and Providence, *Epicurus*, and his Parapharst *Lucretius*: Whose having shown themselves (as I freely confess they have) very subtile Philosophers in explicating divers Mysteries of Nature, ought not so much to recommend to us their impious Errors, about the Original of Things, as to let us see the necessity of ascribing it to an Intelligent Cause. This then is the account of this matter, which is given us by *Epicurus* himself, in that Epistle of his to *Herodotus*, which we finde in *Diogenes Laertius*: *Quod ad Meteora attinet existimari non oportet, aut motum, aut conversionem, aut Ecclipsin, aut ortum occasumvè, aut alia hujuscemodi ideo fieri quod sit Præfectus aliquis, qui sic disponat, disposuerituè ac simul beatitudinem immortalitatemq; possideat*: And having interposed some Lines, to prove that the Providence of God is not consistent with his Felicity, he addes, *Quare opinandum est, tum cum Mundus procreatus est, factos fuisse eos circumplexus convolventium se Atomorum, ut nata fuerit hæc necessitas, quâ circuitus tales obierint*: And elsewhere in the same Epistle, *Infiniti* (says he) *sunt mundi, alii similes isti, alii vero dissimiles. Quippe Atomi cum sint infinitæ, ut non multo ante demonstratum est per infinitatem spatiorum, & alibi aliæ, ac procul ab hoc ad fabrefactionem Mundorum infinitorum variè concurrunt.* And least this Epicurean Explication of the Worlds Original should seem to owe all its unsatisfactorines to its obscure brevity, we shall not scruple to give you that elegant Paraphrase and Exposition of it, which *Lucretius* has delivered in his 5th Book, *De Rerum Natura*:

Sed quibus ille modis, conjectus, materiai
Fundarit Cœlum, ac Terram Pontiq; profunda
Solis, Lunai cursus ex ordine ponam,
Nam certe, neque consiliis primordia rerum

Ordine se quæque atque sagaci mente locarunt,
Nec quos quæque darent motus pepigere profectò:
Sed quia multa modis multis primordia rerum
Ex infinito jam tempore percita plagis,
Ponderibusque suis, consuerunt concita ferri,
Omnimodisque coire, atque omnia pertentare,
Quæcunque inter se possent congressa creare;
Propterea fit, ut magnum volgata per ævum,
Omnigenos cœtus & motus experiundo,
Tandem conveniant: ea quæ conjuncta repentè
Magnarum rerum fiant exordia sæpè
Terrai maris, & cæli generisq; animantum.

The *Hypothesis* express'd in these Verses (which please our Author so well, that he has almost the same Lines in several other places of his Poem) he prosecutes and applies to some particular parts of the Universe in the same 5th Book: But whilst he thus refuseth to allow God an Interest in the Worlds production, his *Hypothesis* requires that we should allow him several things, which he doth assume, not prove: As First, That Matter is Eternal. 2. That from Eternity it was actually divided, and that into such insensibly small parts, as may deserve the name of Atoms; whereas it may be suppos'd, that Matter, though Eternal, was at first one coherent Mass, it belonging to Matter to be divisible, but not so of necessity, to be actually divided. 3. That the number of these Atoms is really infinite. 4. That these Atoms have an *inane Infinitum* (as the Epicureans speak) to move in. 5. That these Atoms are endowed with an almost infinite variety of determinate Figures, some being round, others cubical, others hooked, others conical, *&c.* whereas not to mention beforehand what we may elsewhere object, besides against this Assumption, he shews not why, nor how this Atome came to be Spherical rather then Conical, and another Hooked rather then Pyramidal: But these Assumptions I insist not on, becaus of

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two others much more considerable, which our Author is fain to take for granted in his *Hypothesis*: For 6'y. He supposes his Eternal Atoms to have from Eternity been their own Movers, whereas it is plain that Motion is no way necessary to the Essence of Matter, which seems to consist in extension: For Matter is no less Matter, when it rests, then when it is in motion; and we daily see many parcels of Matter pass from the state of motion to that of rest, and from this to that, communicating their motion to Matter that lay still before, and thereby loosing it themselves. Nor has any Man, that I know, satisfactorily made out how Matter can move it self: And indeed, in the Bodies which we here below converse with-al, we scarce finde that any thing is mov'd but by something else; and even in these motions of Animals that seem spontaneous, the Will or Appetite doth not produce the motion of the Animal, but guide and determine that of the Spirits, which by the Nerves move the Muscles, and so the whole Body, as may appear by the wearinesse and unweildinesse of Animals, when by much motion the Spirits are spent. And accordingly I finde that *Anaxagoras*, though he believed, as *Aristotle* did after him, that Matter was Eternal, yet he discern'd that the notion of Matter not necessarily including motion, there was a necessity of taking in a *Mens*, as he stiles God, to set this sluggish Matter a moving. And I remember *Aristotle* himself, in one place of his Metaphysicks, disputing against some of the antienter Philosophers, askes, *Quonamque modo movebuntur si nulla erit actu causa? non enim ipsa materia seipsam movebit* ἀλλὰ τεχνικὴ *rerum opifex Virtus*: But though elsewhere I have met with Passages of his near of kin to this, yet he seems not to express his Opinion uniformly and clearly enough to engage me to define it or make a Weapon of it: And therefore I shall rather proceed to take notice, That according to the Epicurean *Hypothesis*, not onely the motion, but the determination of that motion is supposed. For *Epicurus* will have his Atoms move downwards, and that not

Aristot: Metaphys: lib. 12. cap. 6.

not in paralel Lines, leſt they ſhould never meet to conſtitute the World, but according to Lines ſomewhat inclining towards one another; ſo that there muſt be not onely motion, but gravity in Atoms, before there be any Centre of gravity for them to move towards; and they muſt move rather downwards then upwards, or ſide-ways, and in ſuch Lines as nothing is produc'd capable of confining them to. Which are Aſſumptions ſo bold and precarious, that I finde ſome, even of his Admirers, to be aſham'd of them: Which will ſave me the labor of arguing againſt them, and allow me to take notice in the 7th place, That this Epicurean Doctrine ſuppoſes that a ſufficient number of Atoms, and their motion downwards being granted, there will need nothing but their fortuitous concourſe in their fall, to give a Being to all thoſe Bodys that make up the World. Indeed, that the various coalitions of Atoms, or at leaſt ſmall Particles of Matter, might have conſtituted the World, had not been perhaps a very abſurd Opinion for a Philoſopher, if he had, as Reaſon requires, ſuppoſ'd that the great Maſs of lazy Matter was Created by God at the Beginning, and by Him put into a ſwift and various motion, whereby it was actually divided into ſmall Parts of ſeveral Sizes and Figures, whoſe motion and croſſings of each other were ſo guided by God, as to conſtitute, by their occurſions and coalitions, the great inanimate parts of the Univerſe, and the ſeminal Principles of animated Concretions. And therefore I wonder not much that the *Mileſian Thales* (the firſt of the Grecian Philoſophers (as *Cicero* informs us) that inquir'd into theſe matters) ſhould hold that Opinion which *Tully* expreſſes in theſe Words: *Aquam dixit eſſe initium rerum, Deum autem eam Mentem quæ ex aqua cuncta finxerat*: And that of *Anaxagoras*, the ſame Author ſhould give us this account, *Omnium rerum deſcriptionem & modum mentis infinitæ vi ac ratione ratione deſignari & confici voluit*: For though theſe great Men exceedingly err'd, in thinking it neceſſary that God ſhould be provided of a pre-exiſtent, and by him not crea-

De Nat: Deorum, lib. 1°.

Idem ibidem.

created Matter to make the World of, yet at leaſt they diſcern'd and acknowledg'd the neceſſity of a Wiſe and Powerful Agent to diſpoſe and faſhion this rude Matter, and contrive it into ſo goodly a Structure, as we behold, without imagining with *Epicurus*, that chance ſhould turn a Chaos into a World. And really it is much more unlikely, that ſo many admirable Creatures that conſtitute this one exquiſite and ſtupendous Fabrick of the World ſhould be made by the caſual confluence of falling Atoms, juſtling or knocking one another in the immenſe vacuity, then that in a Printers Working-houſe a multitude of ſmall Letters, being thrown upon the Ground, ſhould fall diſpoſ'd into ſuch an order, as clearly to exhibit the Hiſtory of the Creation of the World, deſcrib'd in the 3 or 4 firſt Chapters of *Geneſis*, of which Hiſtory, it may be doubted whether chance may ever be able to diſpoſe the fallen Letters into the Words of one Line. I ignore not that ſometimes odde Figures, and almoſt Pictures may be met with, and may ſeem caſually produc'd in Stones, and divers other inanimate Bodies: And I am ſo far from denying this, that I may elſewhere have opportunity to ſhew You, that I have been no careleſſe Obſerver of ſuch Varieties.

But firſt, even in divers Minerals, as we may ſee in Nitre, Chryſtal, and ſeveral others, the Figures that are admired are not produc'd by chance, but by ſomething analogous to ſeminal Principles, as may appear by their uniform regularity in the ſame ſort of Concretions, and by the practice of ſome of the skilfulleſt of the Salt-peter Men, who when they have drawn as much Nitre as they can out of the Nitrous Earth, caſt not the Earth away, but preſerve it in heaps for ſix or ſeven Years; at the end of which time, they finde it impregnated with new Salt-peter, produced chiefly by the ſeminal Principle of Nitre implanted in that Earth. To prove that Metalline Bodies were not all made at the beginning of the World, but have ſome of them a Power, though ſlowly to propagate their Nature when they meet with a diſ-

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posed Matter; you may finde many notable Testimonies and Relations in a little Book of *Physico-Chymical* Questions, Written by *Jo: Conradus Gerhardus*, a *Germane* Doctor, and most of them recited (together with some of his own) by the Learned *Sennertus*: But lest you should suspect the Narratives of these Authors, as somewhat partial to their Fellow Chymists Opinions, I shall here annex that memorable Relation which I finde Recorded by *Linschoten*, and *Garcias ab Horto*, a pair of unsuspected Writers in this case concerning Diamonds, whereby it may appear that the seminal Principles of those precious Stones, as of Plants, are lodg'd in the Bowels of the Mine they grow in: *Diamonds* (says the first, in that Chapter of his Travels where he treats of those Jewels) *are digg'd like Gold out of Mines, where they digg'd one year the length of a Man into the Ground; within three or four years after there are found Diamonds again in the same place, which grow there; sometimes they finde Diamonds of* 400 *or* 800 *Grains.* *Adamantes* (says the latter) *qui altissimè in terræ visceribus, multisq; annis perfici debebant in summo fere solo generantur & duorum aut trium annorum spatio perficiuntur: Nam si in ipsa fodina hoc anno ad cubiti altitudinem fodias Adamantes reperies. Post biennium rursus illic excavato ibidem, invenies Adamantes.* And next, how inconsiderable, alas, are these supposed Productions of Chance, in comparison of the elaborate Contrivances of Nature in Animals? since in the Body of Man, for instance, of so many hundred Parts it is made up of, there is scarce any that can be either left out, or made otherwise then as it is, or plac'd elsewhere then where it is, without an apparent detriment to that curious Engine; some of whose parts, as the Eye, and the valves of the Veins, would be so unfit for any thing else, and are so fitted for the uses that are made of them, that 'tis so far from being likely that such skilful Contrivances should be made by any Being not intelligent, that they require a more then ordinary Intelligence to comprehend how skilfully they are made.

Simpl: in India nascenti. lib. 1. *cap.* 47.

As

As for the account that *Lucretius*, out of *Epicurus*, gives us of the first Production of Men, in I know not what Wombs adhering to the Ground, and which much more becomes him as a Poet, then as a Philosopher, I shall not here waste time to manifest its unlikelyness, that witty Father * *Lactantius* having already done that copiously for me. And indeed it seems so pure a Fiction, that were it not that the *Hypothesis* he took upon him to maintain, could scarce afford him any less extravagant account of the Original of Animals, The unsuitableness of this *Romance*, to those excellent Notions with which he has enriched divers other parts of his Works, would make me apt to suspect, that when he writ this part of his Poem, he was in one of the Fits of that Phrensie, which some, even of his Admirers, suppose him to have been put into by a Philtre given him by his either Wife, or Mrs *Lucillia*; in the Intervals of which, they say, that he writ his Books.

* Tanta ergo qui videat, & talia potest existimare nullo affecta esse consilio, nulla providentia, nulla ratione divinâ, sed ex atomis subtilibus exiguis concreta esse tanta miracula? Nonne prodigio simile est, aut natum esse hominem qui haec diceret, ut Lucippum, aut extitisse qui crederet, ut Democritum, qui auditor ejus fuit, vel Epicurum in quem vanitas omnis de Lucippi fonte profluxit. *lib.* 2. *cap.* 11

And here let us further consider, That as confidently as many Atomists, and other Naturalists, presume to know the true and genuine Causes of the Things they attempt to explicate, yet very often the utmost they can attain to in their Explications, is, That the explicated *Phænomena* May be produc'd after such a Manner as they deliver, but not that they really Are so: For as an Artificer can set all the Wheels of a Clock a going, as well with Springs as with Weights, and may with violence discharge a Bullet out of the Barrel of a Gun, not onely by means of Gunpowder, but of compress'd Air, and even of a Spring. So the same Effects may be produc'd by divers Causes different from one another; and it will oftentimes be very difficult, if not impossible for our dim Reasons to discern surely which of those several ways, whereby it is possible for Nature to produce the same *Phænomena* she has really made use of to exhibit them. And sure, he that in a skilful Watch-makers Shop shall observe how many several ways

Watches and Clocks may be contriv'd, and yet all of them ſhew the ſame things, and ſhall conſider how apt an ordinary Man, that had never ſeen the inſide but of one ſort of Watches, would be, to think that all theſe are contriv'd after the ſame manner, as that whoſe Fabrick he has already taken notice of; ſuch a Perſon, I ſay, will ſcarce be backward to think that ſo admirable an Engineer as Nature, by many pieces of her Workmanſhip, appears to be, can, by very various and differing Contrivances, perform the ſame things; and that it is a very eaſie miſtake for Men to conclude, that becauſe an Effect may be produc'd by ſuch determinate Cauſes, it muſt be ſo, or actually is ſo. And as confident as thoſe we ſpeak of uſe to be, of knowing the true and adequate Cauſes of Things, yet *Epicurus* himſelf, as appears by ancient Teſtimony, and by his own Writings, was more modeſt, not onely contenting himſelf, on many occaſions, to propoſe ſeveral poſſible ways whereby a *Phænomenon* may be accounted for, but ſometimes ſeeming to diſlike the ſo pitching upon any one Explication, as to exclude and reject all others: And ſome Modern Philoſophers that much favor his Doctrine, do likewiſe imitate his Example, in pretending to aſſign not preciſely the true, but poſſible Cauſes of the *Phænomenon* they endeavor to explain. And I remember, that *Ariſtotle* himſelf (what ever confidence he ſometimes ſeems to expreſs) does in his firſt Book of *Meteors* ingeniouſly confeſs, that concerning many of Natures *Phænomena*, he thinks it ſufficient that they May be ſo perform'd as he explicates them. But granting that we did never ſo certainly know in the general that theſe *Phænomena* of Nature muſt proceed from the Magnitudes, Figures, Motions, and thence reſulting Qualities of Atoms, yet we may be very much to ſeek as to the particular Cauſes of this or that particular Effect or Event: For it is one thing to be able to ſhew it poſſible for ſuch and ſuch Effects to proceed from the Various Magnitudes, Shapes, Motions, and Concretions of Atoms, and another thing to be able to declare what preciſe,

and

and determinate Figures, Sizes, and Motions of Atoms, will ſuffice to make out the propoſ'd *Phænomena*, without incongruity to any others to be met with in Nature: As it is one thing for a Man ignorant of the Mechanicks to make it plauſible, that the motions of the fam'd Clock at *Straſburge* are perform'd by the means of certain Wheels, Springs, and Weights, *&c.* and another to be able to deſcribe diſtinctly, the Magnitude, Figures, Proportions, Motions, and (in ſhort) the whole Contrivance either of that admirable Engine, or ſome other capable to perform the ſame things.

Nay, a Lover of diſputing would proceed farther, and queſtion that way of reaſoning, which even the eminenteſt Atomiſts are wont to employ to demonſtrate that they explicate things aright.

For the grand Argument by which they uſe to confirm the truth of their Explications, is, That either the *Phænomenon* muſt be explicated after the manner by them ſpecified, or elſe it cannot at all be explicated intelligibly: In what ſenſe we diſallow not, but rather approve this kinde of Ratiocination, we may elſewhere tell you. But that which is in this place more fit to be repreſented, is, That this way of arguing ſeems not in our preſent caſe ſo Cogent, as they that are wont to imploy it think it to be: For beſides that, it is bold to affirm and hard to prove that, what they cannot yet explicate by their Principles, cannot poſſibly be explicated by any other Men, or any other Philoſophy; beſides this, I ſay, that which they would reduce their Adverſaries to, as an Abſurdity, ſeems not to deſerve that name: For ſuppoſing the Argument to be concluſive, That either the propoſ'd Explication muſt be allow'd, or Men can give none at all that is intelligible, I ſee not what abſurdity it were to admit of the conſequence: For who has demonſtrated to us, That Men muſt be able to explicate all Natures *Phænomena*, eſpecially ſince divers of them are ſo abſtruſe, that even the Learned'ſt Atomiſts ſcruple not to acknowledge their being unable to give an account of them.

And how will it be prov'd that the Omniſcient God, or that admirable Contriver, Nature, can exhibit *Phænomena* by no wayes, but ſuch as are explicable by the dim Reaſon of Man? I ſay, Explicable rather then Intelligible; becauſe there may be things, which though we might underſtand well enough, if God, or ſome more intelligent Being then our own, did make it his Work to inform us of them, yet we ſhould never of our ſelves finde out thoſe Truths. As an ordinary Watch-maker may be able to underſtand the curiouſeſt Contrivance of the skilfulleſt Artificer, if this Man take care to explain his Engine to him, but would never have underſtood it if he had not been taught. Whereas to explicate the Nature and Cauſes of the *Phænomena* we are ſpeaking of, we muſt not onely be able to underſtand, but to inveſtigate them.

And whereas it is peremptorily inſiſted on by ſome Epicureans, who thereby pretend to demonſtrate the excellency and certainty of their Explications, that according to them, Nature is declar'd to produce things in the way that is moſt facile and agreeable to our Reaſon: It may be replyed, That what we are to enquire after, is, how Things have been, or are really produced, not whether or no the manner of their Production be ſuch, as may the moſt eaſily be underſtood by us: For if all things were, as thoſe we reaſon withal maintain, caſually produced, there is no reaſon to imagine that Chance conſidered what manner of their Production would be the moſt eaſily intelligible to us. And if God be allowed to be, as indeed he is, the Author of the Univerſe, how will it appear that He, whoſe Knowledge infinitely tranſcends ours, and who may be ſuppoſ'd to operate according to the Dictates of his own immenſe Wiſdom, ſhould, in his Creating of things, have reſpect to the meaſure and eaſe of Humane Underſtandings, and not rather, if of any, of Angelical Intellects, ſo that whether it be to God, or to Chance, that we aſcribe the Production of things, that way may often be fitteſt or likelyeſt for Nature to work by, which is not eaſieſt for us to underſtand.

And

And as for the way of arguing, so often imploy'd (especially against the Truth we now contend for) and so much rely'd on by many Modern Philosophers, namely, That they cannot clearly conceive such or such a thing propos'd, and therefore think it fit to be rejected; I shall readily agree with them in the not being forward to assent to any thing, especially in Philosophy, that cannot well be conceiv'd by knowing and considering Men: But there is so much difference among Men, as to their faculty of framing distinct Notions of things, and through Mens partiality or lazyness, many a particular Person is so much more apt, then these Men seem to be aware of, to think, or at least, to pretend, that he cannot conceive, what he has no minde to assent to, that a Man had need be wary how he rejects Opinions, that are impugn'd onely by this way of Ratiocination, by which, I hope, it will not be expected that we should be more prevail'd with, then that Sect of Philosophers that imploys it most. And among those that resolve the *Phænomena* of Nature into the Mechanical Powers of Things, or the various Figures, Sizes and Motions of the parts of Matter; I meet with some, as the *Epicureans*, who tell us, They cannot frame a Notion of an Incorporeal Substance or Spirit, nor conceive how, if the Soul were such, it could act upon the Body: And yet others that seem no less speculative, seriously and solemnly professe, That they can conceive a clear and distinct Notion of a Spirit, which they believe the humane Soul, that regulates at least, if not produces divers Motions of the Body, to be; denying on the other side, That it can be clearly conceiv'd, either that any thing that is onely material can think, or that there can possibly be any *Vacuum* (that is, Place without any Body) in the Universe; both which the *Epicureans* profess themselves not onely to conceive as Possible, but to believe as True.

And thus much, *Pyrophilus*, it may suffice to have said in relation to those who would reject God from having any thing to do, either in the Production or Government of the World,

upon

upon this ground, that they, if you will believe them, can explicate the Original and *Phænomena* of it without him; but 'tis not all, nor the greateſt part of the Favorers of the Atomical Philoſophy, that preſume ſo much of themſelves, and derogate ſo much from God: To ſay therefore ſomething to the more moderate and judicious of that Perſwaſion, we will candidly propoſe on their behalf the moſt plauſible Objection we can foreſee againſt the Truth we have been all this while pleading for. They may then thus argue againſt us, That though the Atomiſts cannot ſufficiently demonſtrate from what Natural Cauſes every particular Effect proceeds, and ſatisfactorily explicate after what determinate manner each particular *Phænomenon* is produc'd; yet it may ſuffice to take away the neceſſity of having recourſe to a Deity, that they can make out in general, That all the things that appear in the World, may, and muſt be perform'd by meerly corporeal Agents; or if you pleaſe, That all Natures *Phænomena* may be produc'd by the parcels of the great Maſs of Univerſal Matter, variouſly ſhap'd, connected, and mov'd. As a Man that ſees a ſcrew'd Gun ſhot off, though he may not be able to deſcribe the number, bigneſs, ſhape and coaptation of all the Pieces of the Lock, Stock, and Barrel, yet he may readily conceive that the Effects of the Gun, how wonderful ſoever they may ſeem, may be perform'd by certain pieces of Steel or Iron, and ſome parcels of Wood, of Gun-powder, and of Lead, all faſhion'd and put together according to the exigency of the Engine, and will not doubt, but that they are produc'd by the power of ſome ſuch Mechanical Contrivance of things purely Corporeal, without the aſſiſtance of ſpiritual or ſupernatural Agents.

In anſwer to this Objection, I muſt firſt profeſs to you, That I make a great doubt whether there be not ſome *Phænomena* in Nature, which the Atomiſts cannot ſatisfactorily explain by any Figuration, Motion, or Connection of material Particles whatſoever: For ſome Faculties and Operations of the

the reasonable Soul in Man, are of so peculiar and transcendent a kinde, that as I have not yet found them solidly explicated by corporeal Principles, so I expect not to see them in haste made out by such. And if a spiritual Substance be admitted to enter the Composition of a Man, and to act by and upon his Body; besides that, one of the chief and fundamental Doctrines of the *Epicureans* (namely, That there is nothing in the Universe but *Corpus* and *Inane*) will thereby be subverted; it will appear that an Incorporeal and Intelligent Being may work upon Matter, which would argue, at least a possibility that there may be a spiritual Deity, and that he may intermeddle with, and have an influence upon the Operations of things Corporeal: But to insist no longer on this, let us give a further and direct Answer to the propos'd Objection, by representing, That although as things are now established in the World, an Atomist were able to explain the *Phænomena* we meet with, by supposing the parts of Matter to be of such Sizes, and such Shapes, and to be mov'd after such a manner as is agreeable to the Nature of the particular *Phænomenon* to be thereby exhibited, yet it would not thence necessarily follow, That at the first production of the World, there was no need of a most powerful and intelligent Being to dispose that *Chaos*, or confus'd heap of numberless Atoms into the World, to establish the universal and conspiring Harmonie of things; and especially to connect those Atoms into those various seminal Contextures, upon which most of the more abstruse Operations, and elaborate Productions of Nature appear to depend: For many things may be perform'd by Matter variously figur'd and mov'd, which yet would never be perform'd by it, if it had been still left to it self without being, at first at least, fashion'd after such a manner, and put into such a Motion by an Intelligent Agent. As the Quill that a Philosopher writes with, being dipt in Ink, and then mov'd after such and such a manner upon White Paper, all which are Corporeal things, may very well

well trace an excellent and rational Discourse; but the Quill would never have been mov'd after the requisite manner upon the Paper, had not its motion been guided and regulated by the Understanding of the Writer: Or rather, yet once more to resume our former Example of the *Strasbourgh* Clock, though a skilful Artist, admitted to examine and consider it, both without and within, may very well discern that such Wheels, Springs, Weights, and other Pieces of which the Engine consists, being set together in such a coaptation, are sufficient to produce such and such Motions, and such other Effects as that Clock is celebrated for, yet the more he discerns the aptness and sufficiency of the parts to produce the Effects emergent from them, the less he will be apt to suspect that so curious an Engine was produc'd by any casual concurrence of the Parts in consists of, and not rather by the skill of an intelligent and ingenious Contriver; or that the Wheels, and other parts, were of this or that Size, or this or that determinate Shape, for any other reason, then because it pleas'd the Artificer to make them so; though the reason that mov'd the Artificer to employ such Figures and Quantities, sooner then others, may well be suppos'd to have been, that the Nature of his Design made him think them very proper and commodious for its accomplishment, if not better then any other suited to the several Exigencies of it.

If an *Epicurean* should be told, that a Man, after having been for some days really dead, became alive again, I think it will not be doubted, but that he would reject such a Relation as impossible, and therefore too manifestly false to be believed by any Man in his Wits: And yet, according to his Principles, the Man, as well Soul as Body, consisted onely of divers Particles of the Universal Matter, by various Motions brought together, and disposed after a certain manner: And consequently, he must ground his perswasion that 'tis impossible to redintegrate the Engine once spoil'd by death, upon this,

That

That as Chance cannot with the leaſt probablity be preſum'd to have produc'd ſuch a ſtrange Effect; ſo according to him, there can be no Cauſe aſſign'd, knowing and powerful enough, to rally and bring together again the disbanded and ſcattered parcels of Matter (or ſubſtitute other equivalent ones) that together with the remaining Carcaſe, compoſ'd the dead Man, ſo to reunite them to the reſt; and laſtly, ſo to place and put into Motion both the one and the other, as were requiſite to make a living Man once more reſult from them. I know that this Example reaches not all the Circumſtances of the Controverſie we have been debating; but yet, if I miſtake not, it will ſerve the turn for which I propoſe it: For, not now to inſiſt upon this inference from it, That a conſidering Man may confidently reject a thing that is not abſolutely impoſſible, provided it be highly incredible; not to inſiſt on this, I ſay, the thing I aim at in the mention of it, is onely to ſhew, That ſuch things may poſſibly be effected by Matter and Motion, as no wiſe Man will believe to have been produc'd by a bare Agitation of the Particles of Matter, not guided by the ſuperintendency of a Powerful and Knowing Director.

Now that the Atoms, or Particles of Matter of which the World conſiſts, made no agreement with each other to convene and ſettle in the manner requiſite to conſtitute the Univerſe, *Lucretius* does not ſo properly confeſs, as affirm, in that fore-cited Paſſage where he judiciouſly tells us, That

> —— *Certè neq; conſiliis Primordia rerum*
> *Ordine ſe quæque, atque ſagaci mente locarunt:*
> *Nec quos quæque darent Motus pepigêre profecto.*

And the thing it ſelf is manifeſt enough, from the Nature of Atoms confeſſedly inanimate and devoid of underſtanding.

So that although we ſhould grant, *Pyrophilus*, the poſſible

Emergency of the innumerable Effects we admire in the World, from the various Properties and Coalitions of Atoms, yet ſtill you ſee the formerly mention'd difficulty (touching the Reſulting of All things from Matter left to it ſelf) would recur; and it would as well be incredible that an innumerable multitude of inſenſible Particles, as that a leſſer number of bigger Parcels of Matter, ſhould either conſpire to conſtitute, or fortuitouſly juſtle themſelves into ſo admirable and harmonious a Fabrick as the Univerſe, or as the Body of Man; and conſequently it is not credible that they ſhould conſtitute either, unleſs as their motions were (at leaſt, in order to their ſeminal Contextures and primary Coalitions) regulated and guided by an intelligent Contriver and Orderer of things. And I ſhould ſo little think it a Diſparagement to have but ſo much ſaid of any *Hypotheſis* of mine, that I ſuppoſe I may affirm it, without offending either the moſt ſober, or the generality of the Atomical Philoſophers, to whom, and to their Doctrine, my Writings will manifeſt me to be no otherwiſe affected then I ought.

ESSAY

ESSAY V.

Wherein the Discourse interrupted by the late Digression, is resumed and concluded.

IT remains now, *Pyroph*: that we at length return into the way from whence the foregoing Digression has, I fear, too long diverted us, and that to prosecute and finish our Discourse, we take it up where we left it and were tempted to digress, namely, at the end of the III *Essay*; betwixt which, and the beginning of this V, all that has been interpos'd may be look'd upon but as a long Parenthesis.

In the third place then I consider, That whether or no it be true which our Antagonists suggest, that there are some things in Nature which tempt Philosophers more then they doe the Vulgar, to doubt or deny a God; yet certainly there are divers things in Nature that do much conduce to the evincing of a Deity, which Naturalists either alone discern, or at least discern them better then other Men: For besides the abstruse Properties of particular Bodies, not discover'd by any but those that make particular Enquiries into those Bodies, there are many things in Nature, which to a superficial Observer seem to have no relation to one another; whereas to a knowing Naturalist, that is able to discern their secret Correspondencies and Alliances, these things which seem to be altogether Irrelative each to other, appear so Proportionate and so Harmonious both betwixt themselves, and in reference to the Universe they are parts of, that they represent to him a very differing and incomparably better Prospect then to another

Man: As he that looks upon a Picture made up of ſcatter'd and deform'd pieces, beholding them united into one Face, by a Cylindrical Looking-glaſs aptly plac'd, diſcerns the skill of the Artiſt that drew it, better then he that looks onely on the ſingle parts of that Picture, or upon the whole Picture, without the uniting Cylinder. Which brings into my minde, That whereas in the Sacred Story of the Creation, when mention is made of Gods having conſider'd the Works of each of the firſt ſix Days, at the end of it, it is ſaid of the Work of every Day, *That God ſaw that it was good* (except of the ſecond Day, becauſe the ſeparation of the Waters was but imperfectly made on that day, and compleated in the next, on which it is therefore twice ſaid, *That God ſaw that it was good*) whereas, I ſay, when God look'd upon his Works in particular, it is onely ſaid, *That he ſaw that they were good*; when He is introduc'd at the cloſe of the Creation, as looking upon, and ſurveying his Creatures in their Harmony, and entire Syſtem, it is emphatically ſaid, *That he ſaw every thing that he had made, and behold it was very good.* And if *Ariſtotle* be indeed the Author of the Book *De Mundo ad Alexandrum*, which paſſes for his, and is ſaid to have been Written by him towards the end of his Life, it would not be unworthy our Obſervation to take notice, how he that in his other Writings is wont to talk of Gods Intereſt in the Creatures darkly, and heſitantly enough, is wrought upon by the Contemplation of the Univerſe, as it is an orderly Aggregate or Syſtem of the Works of Nature, to make Expreſſions of the Divine Architect, which are not unworthy of *Ariſtotle*, though being meerly humane they cannot be worthy of God. Amongſt many I ſhall ſingle out ſome; and I hope, *Pyrophilus*, you will excuſe me, if in this *Eſſay*, and ſome of the precedent ones, I do contrary to my cuſtom, employ pretty ſtore of Paſſages taken out of other Authors. For firſt, the nature of my Deſign makes it requiſite for me to ſhew what Opinion the Heathen Philoſophers had of the Study of Phyſiology, and what

Power

Power their Contemplation of Nature had to engage them to Acts of Religion. And next, since divers of the same Passages wherein they had set down their Opinions, contain'd also the Grounds and Reasons of them, whereby they have anticipated much of what we should say upon the same subjects, I was unwilling to deprive you of their pertinent Ratiocinations, or rob them of the Glory of what they had well Written. And this necessary Apology premis'd, let us proceed to consider his Passages; and first, *Restat* (says he) *ut summatim de Causa differamus, quæ cunctarum ipsa rerum vim habet tutricem & continentem, quemadmodum cætera perstrinximus: Flagitii enim instar esset, cum de mundo dicere instituerim, tractatu si minus exquisito fortasse, at certe qui sat esse possit ad formulam doctrinæ crassiorem, intactam præcipuam mundi partem principemq; præterire.* And a little after, *Etenim* (says he) *cunctarum quæ rerum natura complectitur, cum servator est Deus, tum vero quæcunque in hoc mundo quoquomodo perficiuntur eorum omnium idem est Genitor: Non sic tamen ipse ut opificis in morem, animalisq; lassitudinem sentientis labore affici possit, ut qui ea facultate utatur, quæ nulli cedat difficultati, cujus ipse vi facultatis omnia in potestate continet, nec minus etiam quæ longius ab ipso videntur esse summota:* To which purpose he elsewhere says, *Augustius decentiusq; existimandum est, Deum summo in loco ita esse collocatum: Numinis ut tamen ejus vis per universum mundum pertingens, tum Solem, Lunamq; moveat, tum Cælum omne circumagat, simulq; causam præbeat eorum quæ in Terra sunt salutis atq; incolumitatis:* And in the same Book he adds, *Ut vero sūmatim loquamur quod in navi Gubernator est, quod in Curru agitator, quod in Choro præcentor, quod deniq; lex in Civitate, & dux in exercitu, hoc Deus est in mūdo. Nisi si hactenus interest, quod labor, & motus multiplex illos exercet, & curæ angunt variæ, cum huic illaborata succedunt ōnia, omnis molestiæ expertia.* And certainly he that is a stranger to Anatomy, shall never be able to discern in the circulation of the blood, the motion of the Chyle, and the contrivance of all the parts of a humane Body, those

Arist: de Mundo, Cap. 6.

Ibidem.

Eodem Cap.

Eodem Cap.

Proofs

Proofs, as well as Effects, of an Omniſcient Δημιουργὸς, or Artiſt, which a curious Anatomiſt will diſcover in that elaborate and matchleſs Engine: as I remember, I had occaſion not long ſince to take notice of in the ſhape of that ſtrange Muſcle (the *obturator internus*) which ſome call from its Figure *Marſupialis*, ſerving to the motion of the Thigh. For this Muſcle ſeems ſo made, as if Nature had deſign'd in it, to manifeſt, That ſhe is skill'd in the Mechanicks, not onely as a Mathematician that underſtands the powers of Diſtance, Weight, Proportion, Motion and Figure; but as an Artificer, or Handy-crafts man, who knows by dextrous Contrivances to furniſh the more endanger'd parts of his Work, with what is more uſeful to make it laſting: There being (to omit other Obſervables, belonging to that Muſcle) a deep notch made in the *Coxendix*, to ſhorten the way betwixt the two extremities of the Muſcle, and make it bear upon the Bone with a blunter Angle. And becauſe the *Tendon* is long, leſt, notwithſtanding the former proviſion, it ſhould be apt to fret out upon the edge of the Bone, Nature has provided for it a Muſculous piece of Fleſh, wherein it is as it were ſheath'd, that ſo it might not immediately bear, and grate upon the Bone; juſt as our Artificers uſe to ſow Caſes of Leather upon thoſe parts of ſilken Strings, which being to grate upon harder Bodies, were otherwiſe endangered to be fretted out by Attrition.

And a like skilfulneſs of Nature in the Mechanical Contrivance of the Parts, is more obviouſly diſcernable in the Structure of that admirable Engine, by which ſuch variety of other Engines are made, the Hand: where (not to mention the *Ligamentum latum*, or Wriſt-band, that keeps the *Tendons* that move under it from inconveniently ſtarting up upon the Contraction of the reſpective Muſcles) the wonderful perforations that are made through the *Tendons* of the *Muſculi per forat*, by thoſe of the *Muſculi perforantes*, for the more commodious motion of the Joynts of the Fingers, may conſpicuouſly manifeſt the Mechanical Dexterity of Nature; as it may her Huſ-

banding

banding (if I may so speak) of her Work, That in a *Fœtus*, whil'st it lies in the Womb, because the Lungs are not to be display'd as afterwards, and so the Blood needs not circulate thorow Them from the right Ventricle of the Heart, into the left, for the use of Respiration, as it must in grown Animals, she contrives a nearer way; and by certain short Pipes, peculiar to such young Creatures, she more commodiously performs in them the Circulation of the Blood, proportion'd to their present condition; and afterwards, when the Animal is brought out of the Womb into the open Air, and put upon the constant exercise of his Lungs, these temporary Conduit-pipes little by little vanish. So careful is Nature not to do things in vain.

And therefore I do not much wonder, that *Galen*, though I remember he somewhere (unprovokedly and causelessly enough) derides *Moses*, and seems not over-much inclin'd to make Religious acknowledgements; yet when he comes to consider particularly the exquisite Structure of a humane Body, should break forth into very elevated, and even pathetical Celebrations of God, and tell us, That in his Books, *De usu Partium*, he compos'd Hymns to the Creators praise. And certainly, he that shall see a skilful Anatomist dextrously dissect that admirable part of Man, the Eye, and shall consider the curious Contrivance of the several Coats, Humors, and other Parts it consists of, with all their adaptations and uses, would be easily perswaded, That a good Anatomist has much stronger Invitations to believe, and admire an Omniscient Author of Nature, then he that never saw a Dissection, especially if he should see how all of these concur to make up one Optical Instrument to convey the Species of the visible object to the Optick Nerve, and so to the Brain; as I have, with pleasure consider'd it, in the recent Eye of a Cat (for with keeping, it will grow flaccid) cut cleanly off, where the Optick Nerve enters the *Sclerotis*, and is going to expand it self into the *Retina*, for holding this Eye at a convenient distance betwixt

Galenus, lib. 3°. De usu Partium.

betwixt yours and a Candle, you may see the Image of a Flame lively expreſt upon that part of the back ſide of the Eye at which the Optick Nerve enters the above-mention'd *Sclerotis*: Some thing of this kinde we have alſo ſhown our Friends with the eyes of dead Men, carefully ſever'd from their heads; and with the (dexterouſly taken out) Chriſtalline humor of a Humane Eye, we have often read, as with a *Lens* or Magnifying glaſs. And to aſſiſt you in ſo pleaſing a ſpeculation, as that of the Eye, we ſhall adde, That by reaſon Ox Eyes are much larger, and much eaſier to be had then humane ones, we are wont to make much uſe of them, and to diſcern ſome things better in their Coats, we immerſe them for a little while in boyling Water, and to be able to conſider the form and bigneſs of the Vitreous and Cryſtalline humors, better then the fluidity of the one, and the ſoftneſs of the other are wont to allow Anatomiſts to do; we have ſometimes, by a way hereafter to be ſet down, ſpeedily frozen Eyes, and thereby have turn'd the Vitreous humor into very numerous and Diaphanous Films (as it were of Ice, and the Cryſtalline into a firm Subſtance, but (which perhaps you will wonder at) not Tranſparent. An eye thus frozen, may be cut along that which Optical Writers call the Optical Axis, and then it affords an inſtructive Proſpect, which we have not been able to obtain any other way. But becauſe, notwithſtanding this Expedient in the Eyes of Men, and the generality of Terreſtrial Animals, the Opacouſneſs of the *Sclerotis* hinders the Pictures that outward Objects (unleſs they be lucid ones) make with in the Eye to be clearly diſcern'd. We think our ſelves oblig'd to that excellent Mathematician of your Acquaintance, *Pyrophilus*, who, upon ſome Diſcourſe we had with him concerning this Subject, lately adviſ'd us to make uſe of the Eyes of white Rabbets (for if thoſe Animals be of another colour, he ſays, their Eyes will not prove ſo fit for our purpoſe) For having held ſome of theſe Eyes at a convenient diſtance betwixt my Eyes and the Window, I found them to be ſo tranſparent, That the

rayes

rayes proceeding from the Panes of Glass, Iron Bars, *&c.* of the Window, passing through the Crystalline humor, and in their passage refracted, did on the *Retina* exhibit in an inverted Posture, according to the Optical Laws, the contracted, but lively Pictures of those external Objects; and those Pictures, by reason of the transparency of the *Sclerotis*, became visible through it to my attentive Eyes: As in a darken'd Room the shadows of Objects without it, projected on a fine sheet of Paper, may, by reason of the thinness of the Paper, be seen thorow it by those that stand behinde it. By Candle-light we could see little in the bottom of these eyes, but lucid Objects, such as the flame of the Candle, which appear'd tremulous, though inverted; but by Day-light we could manifestly discern in them both the motions of very neighboring Objects, and the more vivid of their colours.

And really, *Pyrophilus*, it seems to me not onely highly dishonorable for a Reasonable Soul to live in so Divinely built a Mansion, as the Body she resides in, altogether unacquainted with the exquisite Structure of it; but I am confident, it is a great obstacle to our rendring God the Praises due to him, for his having so excellently lodg'd us, that we are so ignorant of the curious Workmanship of the Mansions our Souls live in; for not onely the Psalmist, from the consideration of the Divine Art display'd by God, in the moulding and fashioning his Body in the Womb, takes a just occasion to celebrate his Maker, *I will praise thee* (says he) *because I am fearfully and wonderfully made, marvellous are thy works, and that my Soul knoweth right well: My substance was not hid from thee, when I was made in secret, and curiously wrought* (with as much curiosity as Tapstry or Embrodery, as the Hebrew *Rukkamti* seems to import) *In the lowest parts of the Earth, thine eyes did see my substance, yet being unperfect; and in thy Book all my members were written, which in continuance were fashioned, when as yet there were none of them.* But even from *Galen* himself Anatomical Reflections have been able to extort Expressions Psal. 139 v. 14, 15, 16.

of Devotion: *Cum igitur* (says he) *quod in omnibus recte fit, omnes ad artem referunt, quod autem in uno, aut duobus non ad artem, sed fortunam; merito ex nostri structura corporis licet admirari summam artem, æquitatem, & vim naturæ, quæ nos construxit. Constat siquidem corpus nostrum ex ossibus pluribus quam ducentis, ad singula ossa vero pervenit nutriens vena; sicut ad musculos: cum hâc etiam arteria, & Nervi; pariaq; adamussim sunt, & animo similia in dextra animantis parte sita, iis quæ in altera sunt; Os ossi, Musculus musculo, Vena venæ, Arteria arteriæ, ac Nervus nervo; idq; exceptis visceribus, atque nonnullis particulis quæ habere propriam descriptionem videntur. Duplices itaq; corporis nostri partes, omnino inter se sunt similes, & magnitudine & conformatione, sicuti & consistentia quam voco juxta mollitiem, duritiemq; differentia. Quemadmodum igitur de Humanis effectibus judicium facimus, ex navi summa arte constructa cognoscentes peritiam artificis, ita etiam de Divinis facere convenit, corporisq; nostri Opificem admirari, quicunq; tandem is Deorum existat, etiamsi eum non videmus.*

Galen de plac: Hip: & Plat: Libr: 7.

Perhaps it may be truly said yet further, That although in humane Bodies, many Wonders, as we have lately mention'd, have been discover'd to us by Anatomy, yet Anatomy it self has not discover'd to us all the Wonders to be met with in a humane Body, nor will detect them, till Anatomists be skill'd in some other things over and above that of dexterously Dissecting: For it seems very probable, that the excellent contrivance of some parts will never be fully apprehended, without a competent knowledge of the Nature of those Juices that are to pass thorow them, and some of them receive their beginning or some alteration in them; And the Nature of these Juices will scarce be exactly known, without some skill in divers parts of Physiology, and especially in Chymistry. Besides, the reason of the Origination, Shape, Bulk, Length, Progress, and Insection of each particular Muscle, can hardly be well accounted for, without some skill in the Principles of Mechanicks, and in the nature and properties of Leavers, Pul-

leys,

leys, *&c.* Moreover, there is a certain Harmonious Proportion betwixt the parts of a humane Body, in reference both to the whole, and to one another, which is not wont to be heeded by Anatomists, but much taken notice of by Statuaries and Painters: For they reckon, that when a Mans Arms are display'd, the distance betwixt his middle Fingers is equal to the height of his Body; so they reckon sometimes seven, sometimes eight lengths of the Head, to the length of the Body, and four times the length of the Nose to that of the Head, as three times the same length to that of the Face: And divers such Observations we have met with among them, which we shall not now insist on, but rather tell you, That without some skill in Opticks, it will be hard for an Anatomist to shew the Wisdom of God in making the Crystalline humor of the Eyes of Men, onely of a somewhat convex or lenticular form, rather then as those of Fishes of an almost perfectly Spherical one. Nor do I remember that in Anatomy Schools I have heard any account given of this difference, which yet tends much to manifest the Wisdom of the Author of Nature, who has so excellently suited the Eyes of Animals to the several parts of the Universe he design'd them to inhabit. For Men, and other Terrestrial Animals living in the Air, the Beams of Light, reflected from visible Objects, and falling over the *Cornea* and the Aqueous humor, do necessarily suffer a Refraction there, as coming from the Air, which is a thinner *Medium* into a thicker, and so there needs the less of further Refraction to be made by the Crystalline humor, and consequently its Figure needs to be but moderately convex; whereas Fishes living constantly in the Water, the *Medium*, through which they see things, is almost of a like thickness with the *Cornea* and Aqueous humor; so that there being little or no Refraction made in their Eyes but by the Crystalline it self, it was necessary that that should be exceedingly convex, that it might make a very great Refraction, and thereby unite the Beams nearer at hand; which if the Crystalline were less

convex, would tend to a point of Concourſe beyond the *Retina*, and conſequently paint on it but a languid and confuſ'd Picture of the Object they ſhould repreſent.

As for *Paracelſus*, certainly he is injurious to Man, if (as ſome eminent Chymiſts expound him) he calls Man a Microcoſm, becauſe his Body is really made up of all the ſeveral kindes of Creatures the Macrocoſm or greater World conſiſts of, and ſo is but a Model or Epitomy of the Univerſe: For (to omit that the Antients (as *Galen* informs us) gave the Title of Microcoſms to Animals in general) 'tis the Glory and Prerogative of Man, that God was pleaſ'd to make him not after the Worlds Image, but His own. On which occaſion, give me leave to tell you, That however, the conſideration of the dignity conferr'd on us in the Image of God, (in whatever that Image be reſolv'd to conſiſt) ſhould, methinks, be ſome engagement to us to look upon our ſelves as belonging unto God; As our Saviour, from the Image of *Cæſar* ſtampt upon a Coyn, pronounc'd it fit *to render unto Cæſar the things of Cæſar, and to God, thoſe of God.*

Lib. 3. De uſu Part.

In the fourth place, I conſider that the univerſal experience of all Ages manifeſts, That the contemplation of the World has been much more prevalent to make thoſe that have addicted themſelves to it, Believers, then Denyers of a Deity: For 'tis very apparent that the old Philoſophers, for the moſt part, acknowledg'd a God, and as evident it is by their want of revelation, by many Paſſages in their Writings, and by divers other things not now to be inſiſted on, That the conſideration of the works of Nature, was the chief thing that Induc'd them to acknowledge a Divine Author of them. This Truth I could eaſily make out, were I at leiſure to tranſcribe Teſtimonies, which, becauſe I am not, I ſhall content my ſelf to mention to you one, which may well ſerve for many, it being a Confeſſion made by *Ariſtotle*, or whatever other Learned Philoſopher it was, who writ the Book *De Mundo*, That Gods being the Architect and Upholder of the World, was the general belief of the

the Ages that preceded his: *Vetus* (says he) *sermo est à majoribus proditus, inter omnes homines, universa tum ex Deo tum per Deū constituta fuisse, atq; coagmentata, nullamq; naturam satis instructam ad salutem esse posse, quæ citra Dei præsidium, suæ ipsa demum tutelæ permissa sit*: And as for both the Opinion of that eminent Author himself, and the Grounds of it, he speaks of God and the Creation almost in the terms of St *Paul*: *Proinde* (says he) *hæc etiam de Deo sentienda nobis sunt, illo quidem, si vim spectes, Valentissimo, si decorem, Formosissimo, si vitam Immortali, denique si virtutem Præstantissimo. Quapropter cum sit inconspicabilis naturæ omni interituræ, ipsis nihilominus ipse cernitur ab operibus, atq; ea quidem quæ aëre quoquomodo affecto, quæ in terra, quæ in aqua, ea certe Dei opera esse merito dixerimus; Dei inquam opera, eum imperio summo Mundum, ac pro potestate obtinentis, Ex quo deo ut inquit Empedocles Physicus.*

Libro de Mundo, Cap. 6.

Alibi eodem Cap.

Omnia quotquot erunt, quot sunt præsentia, quotq;
Orta fuere antehac stirpes, hominesq; feræq;
Inde etiam volucres, piscesq; humoris Alumni.

And those few Philosophers (if ever there have been any at all) that have been really Atheists, are no ways considerable for their number, in respect of those that have asserted a Deity; and their Paradoxes have been lookt upon as so Irrational, that as soon as they have been propos'd, they have been disdainfully rejected and condemn'd by all the rest of Man-kinde, who have look'd upon the Patrons of them as Monsters rather then Philosophers. And if there be, at this day, any Nations (as Navigators inform us there are in *Brasil*, and some other parts of the *Indies*) that worship no God, they consist not of Naturalists, but Bruit, and Irrational Barbarians, who may be supposed rather to ignore the Being of God, then deny it; and who at least are little less strangers to the Mysteries of Nature, then to the Author of it. And if it be a Truth that there

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are really such Atheistical People, it may serve to recommend to us the Study of Physiology, by shewing us, That without the help of any such innate belief, or perswasion of a God, as is suppos'd connatural to Man, Reason exercis'd upon the Objects the Creation presents us with, is sufficient to convince Philosophers of a Deity; and indeed such a care has God taken, to make his Being conspicuous in his Creatures, that they all seem loudly and unanimously to speak to their attentive Considerers, in the Psalmists Language, *Know ye that the Lord, he is God: 'tis he that hath made us, and not we our selves*: And as it is said, *That the Stars in their courses fought against Sisera*, so it may be truly said, That not onely the Stars, but all the rest of the Creatures do in their courses fight against the Atheists, by supplying an unprejudic'd Considerer of them with Weapons fit to over-throw his impious Error. To which purpose, I remember *Aristotle*, in his Book *De Mundo*, makes use of a pretty Simile to declare the conspicuousness of the Creator in his Creatures: *Fama est* (says he) *Phidiam illum statuarium, quum Minervam illam quæ est in Arce, coagmentaret, in medio ejus scuto faciem suam expressisse, oculosq; fallenti artificio ita devinxisse simulachro, eximere ut inde ipsam siquis cuperet, minime posset, aliter quidem certe, quam ut ipsum solveret simulachrum, opusq; ejusmodi compactile confunderet; Hanc eandem rationem Deus habet in Mundo utpote qui universorum coagmentationem cohærentem cohibeat & coarctet, incolumitatemq; Universitatis conservet; Nisi quatenus non medio ille loco in Terra scilicet, ubi Turbida Regio est, sed in excelso situs est, purus ipse in puro loco.*

Psalm C. 3.

Judg. V. 20.

Cap. 6.

But to declare how Atheists may be reduc'd either to confess a first Cause, or to offer violence to their own Faculties, by denying things as certain as those, which 'tis apparent that (in other cases) themselves firmly assent to, would require a Discourse too large to be proper to be prosecuted here; and therefore if I have not, in another Treatise, an opportunity of insisting on that subject, I must content my self to refer you for

for further satisfaction on it, to the Writers of Natural Theology.

Nor does Physiology barely conduce to make Men believe the existence of a Deity, but admire and celebrate the Perfections of it: And the noblest Worship from that greater part of the World, to which God did not vouchsafe any explicite and particular Revelation of his Will, hath been paid Him, by those whom the beauty of this goodly Temple of the Universe, transported with a rational Wonder at the Wisdom, Power, and Goodness of the Divine Architect. And this kinde of Devotion being commonly proportionate to the discoveries of Nature that begot it, it needs not seem strange, that divers of the best Philosophers amongst the Heathens, should be the greatest Celebrators of God: And 'twas therefore perhaps not without cause that the *Indian* Gymnosophists, the *Persian Magi*, the *Egyptian* Sacrificers, and the old *Gauls Druides*, were to their Peoples both Philosophers and Priests; and that in divers Civiliz'd Nations, Philosophy and Priesthood were so ally'd, that those whose Profession should give them most interest in the definition of Man, made a more strict profession of celebrating and praising God. I might easily, with divers Instances, manifest how great a Veneration the Study of the Creatures has given Philosophers, for those Attributes of God that are stamp'd upon them, and conspicuous in them: But my willingness to hasten to the more Experimental part of what I have to say concerning the usefulness of Physiology, makes me content my self to present you with a couple, or a leash of Authorities, for proof of what has been alledg'd; the first shall be of *Galen*, in his third Book *De usu Partium*, where treating of the Skin that invests the sole of the Foot: *Cutem ipsam* (says he) *non laxam, aut subtilem, aut mollem, sed constrictam, & mediocriter duram, sensilemq; ut non facile pateretur subdidit pedi sapientissimus Conditor noster: Cui commentarios hos, ceu hymnos quosdam compono, & in eo pietatem esse existimans, non si Taurorum* ἑκατόμβας *ei plurimus quispiam*

piam sacrificarit, & casias aliaq; sexcenta unguenta suffumigarit: Sed si noverim ipse primus deinde exposuerim aliis quænam sit ipsius Sapientia, quæ Virtus, quæ Providentia, quæ Bonitus; ignorantia quorum summa Impietas est, non si à sacrificio abstineas. Quod enim cultu convenienti exornavit omnia, nulliq; bona inviderit id perfectissimæ Bonitatis specimen esse statuo, Invenisse autem quo pacto omnia adornarentur summæ Sapientiæ est, at effecisse omnia quæ voluit Virtutis est invictæ. To which Illustrious Passage he annexes much more, worthy of *Galens* Pen, and your perusal.

To this let me adde, in the second place, that of *Hermes Trismegistus*, almost at the very beginning of his first Book, Englished by Dr. *Everard*: *He that shall learn and study the things that are, and how they are ordered and governed, and by whom, and for what cause, or to what end, will acknowledge thanks to the Work-man, as to a good Father, an excellent Nurse, and a faithful Steward; and he that gives Thanks shall be Pious or Religious, and he that is Religious shall know both where the Truth is, and what it is; and learning that, he will be yet more and more Religious*: To which I cannot but adde a resembling Passage of that great Hermetical Philosopher (as his Followers love to call him) *Paracelsus*: *Oppido* (says he) *admirabilis, in suis Operibus, Deus est; à quorum contemplatione nec interdiu, nec noctu desistendum, sed jugiter illorum indagationi vacandum est, Hoc enim est ambulare in Viis Dei.* All which bears witness to, and may, in exchange, receive Authority from that remarkable passage of that Great and Solid Philosopher, Sir *Francis Bacon*, who scruples not somewhere to affirm, "That it is an assured Truth, and a conclusion of Experience, That a little or superficial taste of Philosophy, may, perchance, incline the minde of a Man to Atheism, but a full Draught thereof, brings the Minde back again to Religion. For in the entrance of Philosophy, when the Second Causes, which are next unto the Senses, do offer themselves to the Minde of Man, and the Minde it self cleaves unto them, and dwells there,

Paracel: de Mineral: Tract. 1.

Sir *Francis Bacon Advan:* of Learning, *Lib.* 1.

there, a forgetfulness of the Highest Cause may creep in: But when a Man passeth further, and beholds the Dependency, Continuation, and Confederacy of Causes, and the Works of Providence, then according to the Allegory of the Poets, he will easily believe that the highest Link of Natures Chain must needs be tyed to the foot of *Jupiters* Chair; or (to speak our Chancellors thoughts more Scripturally) That Physiology, like *Jacobs* Vision, discovers to us *a Ladder, whose top reaches up to the foot-stool of the Throne of God*: To which he deservedly addes, *Let no Man, upon a weak conceit of sobriety, or ill-applyed moderation, think or maintain that a Man can search too far, or be too well studied in the Book of Gods Word, or in the Book of Gods Works, Divinity, or Philosophy: But rather let Men awake themselves, and chearfully endeavor and pursue an endless progress or proficiency in both; onely let them beware lest they apply Knowledge to Swelling, not to Charity; to Ostentation, not to Use: And again, That they do not unwisely mingle and confound these distinct Learnings of Theology and Philosophy, and their several Waters together.* Gen. 28.

In the fifth place, *Pyrophilus*, I consider, that when the Divines we are answering suppose Physiology likely to render a Man an Atheist, they do it (as hath above been noted already) upon this Ground, That Natural Philosophy may enable him to explicate both the regular *Phænomena*, and the aberrations of Nature, without having recourse to a first Cause or God. But though this supposal were as great a Truth, as we have endeavored to make it a Mistake, yet I see not why a Studier of Physiology, though never so great a Proficient in it, may not rationally be an utter Enemy to Atheism: For the Contemplation of the Creatures, is but one of the ways of coming to be convinc'd that there is a God; and therefore, though Religion were unable to make use of the Argument drawn from the Works of Nature, to prove the existence of a Deity, yet has she other Arguments enough besides, to keep any Considerate

and Impartial Man from growing an Atheist. And here give me leave, for the sake of these Divines, to observe, That though the Devils be Spirits, not onely extreamly knowing in the Properties of Things (by their hidden skill in Physiology, by which they teach Magicians, and their other Clients, to do divers of the strange things for which they are admired) But also unmeasureably proud, and willing to pervert their knowledge to the cherishing of Atheism; yet St. *James* informs us, Jam. 11,19. *That they themselves believe there is a God, and tremble at him*; which argues, either that skill in Natural Philosophy does not necessarily lead to Atheism, or that there are other Arguments, besides those drawn from Science, sufficient to convince the most refractary of the existence of a Deity.

But not to insist on any thing of this nature, nor so much as to mention what proofs the consideration of our own Minds, and their in-bred Notions, may afford us of a Deity, I shall content my self to minde you, That the several Patefactions which God has been pleas'd to make of himself, to Man especially, those made by seasonably accomplish'd Propheſies, and by Miracles, do not onely demonstrate the Being, but the Providence, and divers of the Attributes of God. And indeed, methinks, the Divines we reason with may well allow these Patefactions to be capable of evincing the existence of a God, since they are sufficient, and, for ought I know, the best Arguments we have to convince a rational Man of the truth of the Christian Religion. For the Miracles of Christ (especially his Resurrection) and those of his Disciples, by being Works altogether supernatural, overthrow Atheism; and being owned to be done in Gods Name, and to authorize a Doctrine ascrib'd to his Inspiration; his Goodness, and his Wisdom, permit us not to believe that he would suffer such numerous, great, and uncontrouled Miracles, to be set as his Seals to a Lie, and delude Men little less then inevitably into the belief of a Doctrine not true. And as for the Miracles themselves (especially that

of

of Christs Resurrection, so much, and so deservedly insisted on by *Peter* to the Jews, and *Paul* to the Gentiles) the truth of them is so ascertain'd to us by many of the solemnist, and most authentick ways of Attestation, whereby the certainty of Matters of Fact is capable of being satisfactorily made out, that 'tis hard to shew how these Testimonies can be deny'd, without denying some acknowledg'd Principle of Reason, or some other received Notion, which these Contradictors Opinions or Practice manifest them to look upon as a truth. And upon this account, so much might be said to evince the reasonableness of assenting to the Christian Religion, and to shew, that as much may be said for it, as need be said for any Religion, and much more then can be said for any other; that it need be no wonder, that, as Learned Men as ever the World admir'd, have not been many of them Embracers, but some of them Champions of it. But having more fully, in another Treatise, discours'd of this subject, I shall content my self to make this Inference from what has been alledg'd, that since the most Judicious Propugners of Christianity have held and found, that, upon the score of Gods miraculous Revelations of himself, rational Men might be brought to believe the abstruser Articles of the Christian Religion, those Revelations cannot but be sufficient to convince them of so fundamental and refulgent a Truth (which all the others suppose) as that of the existence of God.

In the sixth and last place, I will here adde (on this occasion) that an insight into Physiological Principles, may very much assist a Man to answer the Objections of Atheists, against the Being of a Deity, and the Exceptions they make to the Arguments brought to prove that there is one: For though it has long been the custom of such Men, to talk as if themselves, and those of their minde, were not alone the best, but almost the onely Naturalists; and to perplex others with pretending, that, whereas it is not conceiveable how there can be a God,

all things are by the Principles of the Atomical Philoſophy, made clear and facil. Though this, I ſay, have long been uſ'd among the Oppoſers of a Deity, yet he that not regarding their confidence, ſhall attentively conſider the very firſt Principles of things, may plainly enough diſcern, that of the Arguments wherewith Natural Philoſophy has furniſh'd Atheiſts, thoſe that are indeed conſiderable, are far fewer then one would readily think; and that the difficulty of conceiving the Eternity, Self-exiſtence, and ſome other Attributes of God (though that afford them their grand Objection) proceeds not ſo much from any abſurdity belonging to the Notion of a Deity, as ſuch; as from the difficulty which our dim humane Intellects finde to conceive the Nature of thoſe firſt Things (whatever we ſuppoſe them) which, to be the Cauſes of all others, muſt be themſelves without cauſe: For he that ſhall attentively conſider, what the Atomiſts themſelves may be compell'd to allow concerning the Eternity of Matter, the Origine of local Motion (which plainly belongs not to the Nature of Body) the Infinity or Boundleſneſs of ſpace, the Diviſibleneſs or non-Diviſibility of each Corporeal Subſtance into infinite Material Parts, may clearly perceive that the Atomiſt, by denying that there is a God, cannot free his Underſtanding from ſuch puzling Difficulties as he pretends to be the Reaſons of his Denyal. For inſtead of one God, he muſt confeſs an infinite number of Atoms to be Eternal, Self-exiſtent, Immortal, Self-moving, and muſt make Suppoſitions, incumbred with Difficulties enough to him that has competently accuſtomed his Thoughts to leave Second Cauſes beneath them, and contemplate thoſe Cauſes that have none. But I am unwilling to ſwell this Eſſay, by inſiſting on ſuch Conſiderations as theſe, eſpecially ſince you may finde them more aptly deduc'd in other Papers, ſome of which treat of the Truth of Chriſtian Religion, and others are deſign'd for the Illuſtration of ſome things in this

and

& the fore-going Essays. For I must confess to you, *Pyrophilus*, that by reason of the sundry Avocations, I have been so diverted from proposing some of the Reasons I have employ'd, to their best advantage, that I my self, at another time, could have both mention'd them with lesser disadvantage, and have added divers others: And therefore I have not onely had thoughts of enlarging upon some Passages of our past Discourse, but I long since made a Collection (though it be not now in my power) of Observations, and Experiments to elucidate a Point in one of those Discourses, whereby may be enervated one of the three chief Physiological Reasonings, that I have met with among the Atheists.

Upon consideration of all the Premises, I confess, *Pyrophilus*, that I am enclined to think there may, perhaps, be more cause to apprehend, that the delightfulness of the Study of Phisiology should too much confine your Thoughts and Joys to the Creatures, then that your Proficiency in it should bring you to dis-believe the Creator: For I have observ'd it to be a fault, incident enough to Ingenious Persons, to let their mindes be so taken up, and, as it were, charm'd with that almost infinite variety of pleasing Objects, which Nature presents to their Contemplation, that they too much dis-relish other Pleasures and Employments, and are too apt to undervalue even those wherewith the improv'd Opportunities of serving God, or holding Communion with Him, are capable of Blessing the Pious Soul.

But, *Pyroph*: though comparatively to Fame, and Mistresses, and Baggs, and Bottles, and those other transient, unsatisfactory, (in a word) deluding Objects, on which the greatest part of mistaken Mortals, so fondly dote, the entertaining of our Noblest Faculties, with Objects suited to them, and proper both to gratifie our Curiosity, and to enrich our Under-

understandings, with variety of acceptable and useful Notions, affords a satisfaction that very well deserves thechoice and preferrence of a rational Creature: Yet certainly, *Pyrophilus*, as God is infinitely better then all the things that he has made, so the Knowledge of Him is much better then the knowledge of them; and he that has plac'd so much delightfulness in a Knowledge, wherein he allows his very Enemies to become very great Proficients, has sure reserv'd much Higher, and more contenting Pleasures to sweeten and endear those Disclosures of Himself, which He vouchsafes to none but those that love Him, and are lov'd by Him.

And therefore, *Pyrophilus*, though I will allow you to expect from the Contemplation of Nature a greater satisfaction, then from any thing you need decline for it, yet I would not have you expect from it any such satisfaction as you may entirely acquiesse in, for nothing but the enjoyment of Him that made the Soul for Himself can satisfie it, the Creatures being as well uncapable to afford us a compleat Felicity by our Intellectual Speculations of them, as by our sensual Fruitions of them; for though the knowledge of Nature be preferrable by odds to those other Idols which we have mention'd, as inferior to it, yet we here attain that knowledge, but very imperfectly, and our acquisitions of it cost us so dear, and the Pleasures of them is so allay'd with the disquieting Curiosity they are wont to excite, that the wisest of Men, and greatest of Philosophers among the Antients, scruples not, upon his own experience, to call the addicting of *ones heart to seek and search out by Wisdom, concerning all things that are done under the Heaven, a sore travel given by God to the sons of Men, to be exercis'd* (or, as the Original hath it, *to afflict themselves*) *therewith*: And the same experienc'd Writer elsewhere tells us, *That he that encreases knowledge, encreases sorrow.* And 'twas perhaps for this reason that *Adam* was form'd out of Paradice, and afterwards by God brought into it, to intimate, That

Eccles. 1.13.

Eccles. 1.18.

Felicity

Felicity is not a thing that Man can acquire for himself, but must receive as a free gift from the liberal Hand of God: And as the Children of the Prophets sought translated *Elias* with very great diligence, but with no success, so do we as Fruitlesly as Industriously, seek after perfect Happiness here, both they and we, missing of what we seek for the same reason; because we seek for that on Earth, which is not to be found but in Heaven: And this I forewarn you of, *Pyrophilus*, not at all to discourage you from the study of Physiology, but to keep you from meeting with that great Discouragement of finding in it much less of satisfaction then you expected, and over-great expectation from it, being one of the disadvantagiousest Circumstances with which it is possible for any thing to be enjoyed. 2 Kings cap. 2.

But at length, *Pyrophilus*, though late, I begin to discern into how tedious a digression my zeal for Natural Philosophy, and for you, has mis-led me, and how it has drawn from my Pen some Passages, which may seem to relish more of the Preacher, then the Naturalist; yet I might alledge divers things to justifie, or, at least, extenuate what I have done: As first, That if in making this Excursion I have err'd, I have not done so without the Authority of great Examples; for not onely *Seneca* doth frequently both season his Natnral Speculations with Moral Documents and Reflections, and owns, that he purposely does so, where he says, *Omnibus rebus, omnibusq; sermonibus aliquid salutare miscendum est, cum imus per Occulta Naturæ, &c.* but even *Pliny* (as far as he was from being guilty of over much Devotion) does from divers Passages in his Natural History, allow himself to take occasion to inveigh against the Luxury, Excesses, and other Epidemical Vices of his time. And I might next represent, that perhaps the endeavoring to manifest, that the knowledge of the Creatures should, and how it may be referr'd to the Creators Glory, is not altogether impertinent to the design I have of promoting Physio- *Seneca Nat: Quæst: lib. 2. cap. 59.*

Physiology, for it seems consonant both to God's Goodness, and that repeated Axiome in the Gospel, which tells us, *That he that improves his Talents to good uses, shall be intrusted with more,* That the imploying the little Knowledge I have in the service of Him I owe it to, may invite Him to encrease that little, and make it less despicable. And perhaps it is not the least cause of our ignorance, in Natural Philosophy it self, that when we study the Great Book of Nature, call'd *The Universe*, we consult, peradventure, almost all other Expositors to understand its Mysteries, without making any address for instruction to the Author, who yet is justly stil'd in the Scripture, *That Father of Lights* (in the plural Number) *from whom descends every good and every perfect Gift*, not onely those supernatural Graces, that relate to another World, but those intellectual Endowments, that qualifie Men for the prosperous Contemplation of this: And therefore in the Evangelical Prophet, he is said, to instruct even the Plough man, and teach him the skill and understanding he displays in his own Profession. And though I dare not affirm, with some of the *Helmontians* and *Paracelsians*, that God discloses to Men the Great Mystery of Chymistry by Good Angels, or by Nocturnal Visions, as he once taught *Jacob*, to make Lambs and Kids come into the World speckled, and ring-streaked; yet perswaded I am, that the favor of God does (much more then most Men are aware of) vouchsafe to promote some Mens Proficiency in the study of Nature, partly by protecting their attempts from those unlucky Accidents which often make Ingenuous and Industrious endeavors miscarry; and partly by making them dear and acceptable to the Possessors of Secrets, by whose Friendly Communication they may often learn that in a few Moments, which cost the Imparters many a Years toyl and study; and partly too, or rather principally, by directing them to those happy and pregnant Hints, which an ordinary skill and industry may so improve as to do such things, and make

Jam. 1. 17.

Isa. 28. 25, 26.

Gen. 31.

make such discoveries by virtue of them, as both others, and the person himself, whose knowledge is thus encreased, would scarce have imagin'd to be possible: And in effect, the chiefest of the Secrets that have been communicated to me, the Owners have acknowledg'd to me to have been attain'd, rather, as they were pleas'd to speak, by accidental Hints, then accurate Enquiries: confessions of this nature I have divers times met with in the Writings of the more Ingenious of the Chymists, and of other Naturalists, and by one of these accidental Hints, of late, the acute and lucky *Pecquet* was directed to finde the newly discovered *Lactea Thoracica*, as before him *Asellius* found without seeking, as himself confesseth, the *Lactea Mesenterica*; and by an accident too (as himself hath told me) did our industrious Anatomist, Dr. *Jolive*, first light upon those yet more freshly detected Vessels, which afterwards the Ingenuous *Bartholinus*, without being inform'd of them, or seeking for them, hath met with, and acquainted the World with, under the name of *Vasa Lymphatica*; and the two great Inventions of the later Ages, Gunpowder, and the Loadstones respect unto the Poles, are suppos'd to be due rather to Chance, then any extraordinary skill in Philosophical Principles (which indeed would scarce have made any Man dream of such extravagant Properties, as those of Magnetick Bodies) As if God design'd to keep Philosophers humble, and (though he allow regular Industry, sufficient encouragement, yet) to remain Himself dispenser of the chief Mysteries of Nature.

To what hath been represented, *Pyrophilus*, I might adde much more to excuse my Excursions, if I were not content to be beholden to you for a Pardon, and to invite you to grant it me, I shall promise you to be very careful not to repeat the like offence; and whereas most Chymical Writers take occa-

sion from almost every Discovery or Process they acquaint us with, to digress and wander into tedious, and too often dull and impertinent Theological Reflections or Sermons. I have troubled you with almost all that I have to say (to you) of Theological at once, and I have endeavored to sprinkle it as far as the subject would allow me, with some Passages Experimental. And indeed I should not at all have engag'd my self into so long a Discourse of the not onely Innocency, but Usefulness of the knowledge of Nature, in reference to Religion, but that I could not acquiess in what I had met with on that subject in any of the Writers I have perus'd, Divines being commonly too unacquainted with Nature, to be able to manage it Physiologically enough, and Naturalists commonly esteeming it no part of their work to treat of it at all. And therefore I scruple not to confess freely to you, *Pyrophilus*, that, as I shall think my self richly rewarded for all the ensuing Essays, if the past Discourse but prove so happy as to bring you to value, and to make the Religious use of the Creatures recommended to you in it: So I had rather any of my Papers should be pass'd by unperused, then those parts of these Essays that treat of that use. And indeed 'tis none of the least of Satisfactions, I hope, to derive from my Physical Composures, that by premising before them the now almost finish'd Discourse, I have done my hearty endeavor to manifest and recommend the true use of all the Discoveries of Nature, which either my Enquiries, or your own, may afford you. And indeed for my part, *Pyrophilus*, I esteem the Doctrine I have been pleading for of that importance, that I am perswaded, That he that could bring Philosophical Devotion into the request it Merits, should contribute as much to the solemnizing of Gods Praises, as the Benefactor of Choristers and Founders of Chauntries, and not much less then *Davids* so cele-

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brated designation and settlement of that Religious Levitical Musick, instituted for the solemn Celebration of God.

For the sensible Representations of Gods Attributes to be met with in the Creatures, occurring almost every where to our observation, would very assiduously solicit us to admire Him, did we but arightly discern Him in them: And the Impressions made on the Minde by these Representations, proceeding not from a bare (and perhaps languid) whether Belief or Notion of the Perfections express'd in them, but from an actual and operative intuition of them, would excite an admiration (with the Devotion springing thence) by so much the more intense, by how much (it would be) more rational. And sure, *Pyrophilus*, so much admirable Workmanship as God hath display'd in the Universe, was never meant for Eyes that wilfully close themselves, and affront it with the not judging it worthy the speculating. Beasts inhabit and enjoy the World: Man, if he will do more, must study, and (if I may so speak) Spiritualize it: 'Tis the first act of Religion, and equally obliging in all Religions: 'Tis the duty of Man, as Man; and the Homage we pay for the Priviledge of Reason: Which was given us, not onely to refer our selves, but the other Creatures, that want it, to the Creators Glory. Which makes me sometimes angry with them who so busie themselves in the Duties and Imployments of their second and superinduc'd Relations, that they will never finde the leisure to discharge that Primitive and Natural Obligation, who are more concern'd as Citizens of any place, then of the World; and both worship God so barely as Catholick or Protestants, Anabaptists or Socinians, and live so wholy as Lords or Councellors, *Londoners* or *Parisians*, that they will never finde the leisure, or consider not that it concerns them to worship and live as Men. And the neglect of this Philosophical Worship of

God, for which we are pleading, seems to be culpable in Men proportionably to their being qualified, and comply with that invitation of the Psalmist, to *sing Praises* to God *with understanding*, or (the Expression in the Original being somewhat ambiguous) *to sing to him a learn'd Canticle*, as he elsewhere speaks, *to praise him according to his excellent Greatness*. For Knowledge being a gift of God, intrusted to us to glorifie the Giver with it, the Greatness of it must aggravate the neglect of imploying it gratefully; and the sublimest Knowledge here attainable will not destroy, but onely heighten and enoble our admiration, and will prove the Incense (or more spiritual and acceptable part, of that Sacrifice of Praise (for those reflections which their Nature makes onely acts of Reason, their End may make acts of Piety) wherein the Intelligent Admirer offers up the whole World in Eucharists to its Maker. For admiration (I do not say astonishment or surprize) being an acknowledgement of the Objects transcending our Knowledge, the learneder the transcendent Faculty is, the greater is the admired Objects transcendency acknowledg'd: And certainly, Gods Wisdom is much less glorifi'd by the vulgar astonishment of an unlettered Starer (whose ignorance may be as well suspected for his Wonder, as the excellency of the Object) then from their learned Hymns, whose industrious Curiosity hath brought their understandings to a prostrate Veneration of of what their Reason, not Ignorance, hath taught them not to be perfectly comprehensible by them.

Psal. 47. 7.

Psa. 150. 2.

And as such Persons have such piercing Eyes, that where a transient or unlearned glance scarce observes any thing, they can discern an adorable Wisdom, being able (as I may so speak) to read the Stenography of Gods omniscient hand; so their skilful Fingers know how to choose, and how to touch those Strings that may sound sweeteſt to the Praise of their Maker

Maker. And on the open'd Body of the same Animal, a skilful Anatomist will make reflections, as much more to the honor of its Creator, then an ordinary Butcher can; as the Musick made on a Lute, by a rare Lutanist, will be preferable to the noise made on the same Instrument by a Stranger unto Melody. And give me leave to tell you, *Pyrophilus*, that such a reasonable Worship (λογικὴ λατρεία) of God (to use St. *Paul*'s Expression, though in an other sense) is perhaps a much nobler way of adoring him, then those that are not qualified to practise it, are aware of, and is not improper even for Christians to exercise: For, *Pyrophilus*, it would be considered, That as God hath not by becoming (as the Scripture more then once stiles him) our Saviour laid by his first Relation to us as our Creator (whence St. *Peter* exhorts, even the suffering Christians of his time, to commit their Souls to God under the notion of a Faithful Creator) so neither hath he given up his right to those Intelligent Adorations from us, which become us upon the account of being his rational Creatures; neither are such performances made less acceptable to him by the filial relation into which Christ hath brought us to him, that Glorious relation as well endearing to him our services as our persons.

Rom. 12. 1.

1 Tim. 1. 1. Tit. 2. 10.

1 Pet 4. 19.

And let me adde, *Pyrophilus*, that not onely *Galen* (as we have seen already) tells us, That the discerning ones self, and discovering to others the Perfections of God display'd in the Creatures, is a more acceptable act of Religion, then the burning of Sacrifices or Perfumes upon his Altars; and not onely *Trismegistus* forbidding *Asclepius* to burn Incense, tells him, *That the Thanks and Praises of Men, are the noblest Incense that can be offered up to God*: But God himself (in his written Word) is pleas'd to say, *That he that sacrificeth Praise*

Hermes Trismeg. In Asclep. cap. 15.

(for

(for so'tis in the Original) *honoreth him*: And the Scripture consonantly mentions as a very acceptable part of Religious Worship, the *Sacrifice of Praise, and the Calves of our Lips*: By offering up of which, we make that true use of the Creatures, of so referring them to their Creators Glory, that (to conclude this Discourse by Crowning it (as it were) with that excellent Circle mention'd by the Apostle) As *all things are Of him, and Through him*, so they may be *To him: to whom be Glory for ever* Amen.

Hebr. 13. 15.

Rom. 11. 36.

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The Citations Engliſh'd.

P. 24. *Seneca de Otio Sap. Cap.* 32.

'NAture, conſcious to her Self of her own Beauty and 'Artifice, hath given us a curious ſearching Wit, and to 'ſo excellent and great ſhews, begat us to be Spectators; other-'wiſe, ſhe would have loſt the Fruit of her Self, if to a de-'ſert and ſolitude ſhe ſhould have ſet forth ſo magnificent, ſo 'famous, ſo finely drawn, ſo fair and many ways beautiful 'Pieces. That you may know ſhe would not only have them 'ſeen, but look'd upon, take notice of the place ſhe hath given 'us: For ſhe hath not onely made Man of an upright Stature, 'but being ſo made, for better Contemplation, that he might 'follow with his Eye the courſe of the Stars, from the Riſing 'to the Setting, and carry about his Looks, together with his 'whole Body, ſhe hath both given him a tall Head, and placed 'that upon a flexible Neck: Then ſhe ſhews ſix Conſtellations 'by Day, and ſix by Night; She hath laid open every part of 'her Self, that by thoſe things which ſhe hath offered to the 'Eyes of Man, ſhe might breed a deſire of knowing the reſt. 'Yet neither do we ſee all her Works, nor thoſe that we ſee, 'do we ſee in thoſe Proportions which they truly have: But our 'Sight, by ſearching, does open a way unto it ſelf, and lay the 'grounds of Truth, that ſo Inquiry may paſs from things that 'are plain to things that are obſcure, and finde ſomewhat more 'Ancient even then the World it ſelf, See *Sen. de Vita Beata*, '*Cap.* 32.

'*Pag.* 28. What does he that contemplates the Nature of 'the Univerſe, of honor unto God? This, that his great Works 'are not without a Witneſs.

P. 28.

P. 28. *Sen.* 2. *de Ira. cap.* 27.

'We are not the cauſe of the ſeaſons and returns of Sum-
'mer and Winter to the World: Theſe have their own Laws,
'accommodated to the Exerciſe of Divine Beings: We ar-
'rogate too much honor to our ſelves, if we eſteem our
'ſelves worthy that ſuch vaſt Bodies ſhould fulfil ſuch Motions
'for our ſakes.

Ib. Lactantius de Ira Dei, cap. 13.

'True is the Opinion of the Stoicks, that ſay, How that
'for our ſakes the World was made for all things that are, and
'the World doth by it ſelf generate, are accommodated to the
'Advantage of Man.

Ib. Seneca de Benef. cap. 23.

'The Gods were not careleſs or unconcern'd in the making
'of Man, for whom they made ſo many other Creatures: For
'Nature deſign'd us, and drew us out in Idea before ſhe made
'us.

Ib. Cicero 2. *De Nat. Deorum.*

'And for whoſe ſake then was the World made? For thoſe
'Beings that have Reaſon and Intelligence *viz.* Gods and
'Men, then whom no Being is more excellent.

P. 43. *Piſo in Medicina Braſil: Lib.* 1.

'It is obſervable, That ſo many excellent Trees, Shrubs,
'and an innumerable company of Herbs, ſome few excepted,
'ſhould all appear ſo unlike the Vegetables of the Antiently
'known World, both in Figure, Leaf and Fruits: And the
'ſame Obſervation is made of Birds, Beaſts and Fiſhes; and of
'Inſects both Flying and Creeping, which are monſtrouſly

" numerous, and of unſpeakable Beauty in Colour, ſome " known to us, and ſome unknown.

P. 47. *Piſo*, ib. " You can ſcarce determine, whether in " theſe Countries there are found more Poiſons or Anti- " dotes: The Leaves, Flowers, and Fruits of the Herbs " *Tangarack* and *Juquer*, the two moſt potent Venoms of " *Braſil*, each of theſe hath its proper Root for an oppo- " ſite Antidote—The *Barbarians* apply the Fat and Heads " of Vipers, and the whole Bodies of thoſe Inſects, prepa- " red according to Art, that ſtung or ſtruck any Perſon, and " that with boldneſs, and happy ſucceſs, to the Wounds made " by them, and ſo by the effects do attempt to prove, That " in every Venom its own Antidote is contained.

P. 49. *Piſo*, ib.

" From the Root *Mandihoca*, that abounds with a very " potent Poiſon, there is made not onely excellent Aliment, " but even Antidote too.

P. 50. *Ex Auguſtino.*

" You ought not to uſe your Eyes as a Bruit, onely to take " notice of Proviſions for your Belly, and not for your " Minde: Uſe them as a Man: Pry up into Heaven: See the " things made, and enquire the Maker: Look upon thoſe " things you can ſee, and ſeek after Him whom you can- " not ſee, and believe on Him you cannot ſee, becauſe of thoſe " things you ſee: And be not like the Horſe and Mule, *&c.*

P. 75. *Epicurus in Epiſt: ad Herod: in Laertio.*

" As to the Meteors, you ought not to believe that there " is either Motion, or Change, or Eccliſpe, or the riſe or

 ſetting

'ſetting of them, becauſe of any ſuperior Preſident, which 'doth, or hath ſo diſpoſed of it, and himſelf poſſeſſes all the 'while Happineſs and Immortal Life: Wherefore you muſt 'think, that when the World was made, thoſe implications 'and foldings of Atoms happen'd, which cauſed this neceſſi-'ty, that theſe Bodies ſhould paſs through theſe Motions.

'There are infinite Worlds, ſome like this, ſome unlike it: 'For ſince Atoms are infinite (as I newly ſhewed from the in-'finiteneſs of the Spaces) ſome in one, others in others, di-'ſtant parts of theſe Spaces far from us, variouſly concur to 'the making of infinite Worlds.

P. 75. Lucretius, Lib. 5.

But how at firſt, when Matter thus was whirl'd,
Heav'n, Earth, and Sea, the high and lower World,
The Sun and Moon, and all were made, I'le ſhew:
For ſure the firſt rude Atoms never knew
By ſage Intelligence, and Councel grave,
T'appoint the places that all Beings have:
Nor will I think, that all the Motions here
Order'd at firſt by fixt Agreements were,
But th'Elements that long had beat about,
Been buffeted, now in, now carryed out:
Screw'd into every hole, and try'd to take,
With any thing, in any place to make
Somewhat at laſt; after much time and coyl,
Motions and Meetings, and a world of toyl
Made up this Funto. And thus being joyn'd:
And thus in kinde Embraces firmly twin'd,
And link'd together, they alone did frame,
Heav'n, Earth and Sea, and th' Creatures in the ſame:

P. 77. *Aristot: Metaph:* 12. *c.* 6.

'How shall things be mov'd if there be no actual cause: 'For Matter cannot move it self, but requires to be mov'd by 'a *Tectonic*' thing-creating Power.

P. 78. *Ciceronis de Thalete.*

'He said, Water was the Principle of all things, but God 'was that Intelligence, that made all things out of Water: '*Ejusdem de Anaxagorâ:* The delineation and manner of all 'things he thought to be design'd and made by the power and 'reason of an infinite Intelligence.

P. 80. *Garcias ab Horto, L.* 1. *simp: c.* 47.

'Diamonds, which ought to be brought to perfection in the 'deepest Bowels of the Earth, and in a long tract of Time, 'are almost at the top of the Ground, and in three or four 'Years space made perfect: For if you dig this Year but the 'depth of a Cubit, you will finde Diamonds; and after two 'Year dig there, you will finde Diamonds again.

P. 93. *Arist: de Mundo. cap.* 6.

'It remains that we speak briefly concerning that Cause, 'whose Power preserves and supports all things, in like man-'ner, as we have compendiously handled other matters: For 'it would seem criminal to pass over the chief part of the 'World untouch'd, having design'd to discourse of the Uni-'verse in a Treatise, which, if less accurate, yet certainly may 'be sufficient for a rough platform of Doctrine.

Ibid.

'For God is both the Preserver of all things contain'd in

'the Universe, and likewise the Producer of every thing 'whatsoever which is any wise made in this World: Yet not 'so as to be sensible of labor, after the manner of a Work-'man, or a Creature, which is subject to wearines; for he is 'indued with a power which is inferior to no difficulty, and 'whereby he contains all things under his authority, even 'such as seem most distant from him.

'Tis more magnificent and agreeable to conceive God, so 'resident in the Highest Place, that nevertheles his Divine 'Energy being diffus'd throughout the whole World, moves 'both the Sun and Moon, turns round the whole Globe of 'Heaven, and affords the causes of Safety and Preservation 'of such things as are upon the Earth.

'But to sum up all in brief; what the Pilot is in a Ship; 'what the Driver in a Chariot; what the chief Singer is in a 'Dance: finally, what Magistracy is in a Commonwealth, 'and the General in an Army, That is God in the World: 'Unless there be this difference, That much toil and manifold 'cares perplex them; but all things are perform'd by God 'without labor or trouble.

P. 98. Galen. de Plac: Hipp: & Plat: Lib. 7.

'Whereas therefore (saith he) all Men ascribe that to Art, 'which is made aright in all respects; but that which is so only 'in one or two, not to Art, but Fortune: The structure of 'our Body gives us cause to admire the excellent Art, exact-'nes and power of Nature which fram'd us. For our Body 'consists of above Two hundred Bones; to each of which 'tends a Vein for conveying of nourishment (in like manner 'as to the Muscles) which is accompanied with an Artery and 'a Nerve; and the parts are exactly pairs, and those plac'd 'in the right side of an Animal, are wholly alike to those in

'the

'the other, Bone to Bone, Muſcle to Muſcle, Vein to Vein, 'Artery to Artery, and Nerve to Nerve; excepting onely 'the Bowels, and ſome other parts, which ſeem to have a pe- 'culiar conſtruction. So that the parts of our Body are 'double, and altogether alike among themſelves, both in 'greatneſs and ſhape, as alſo in conſiſtence, which I place in 'the diverſity of ſoftneſs and hardneſs. As therefore we uſe 'to judge of things made by Men, acknowledging the skill 'of a Work-man, by the building of a Ship with extraordi- 'nary Art; ſo alſo it behoveth to do in thoſe of God, and to 'admire the Framer of our Body, whoſoever of the Gods he 'were, although we do not ſee Him.

P. 101. *Ariſt: de Mundo, Cap. 6.*

'Tis an ancient Tradition (ſaith he) diffuſ'd amongſt all 'Mankinde from our Anceſtors, That all things were made 'and produc'd of God, and by God; and that no Nature can 'be ſufficiently furniſh'd for its own ſafety, which is left with- 'out the ſupport of God, to its own protection.

P. Ead:

'Thus therefore we ought to conceive of God; If we con- 'ſider His Power, He is Omnipotent; if His Shape, moſt 'Beautiful; if His Life, Immortal; and finally, if His Vir- 'tue, moſt Excellent. Wherefore though undiſcernable by 'any corruptible Nature, yet He is perceiv'd by ſuch, in 'His Works; and indeed thoſe things which are pro- 'duc'd in the Air, by any mutation whatſoever; in the 'Earth, or in the Water, we ought deſervedly to term the 'Works of God; which God is the abſolute and ſoveraign 'Lord of the World, and out of whom (as ſaith *Empedocles* 'the Naturaliſt)

All

All things beginning have, which e'r shall be,
Are present or to come, Plants, Men and Beasts,
And Fowl, and Fish the off-spring of the Sea.

Pag. 102. *Arist: de Mundo, Cap.* 6.

'Tis reported, That when *Phidias*, the excellent Statuary, 'made the Image of *Minerva*, which is in the Castle at *A-*'*thens*, he contriv'd his own Picture in the middle of her 'Shield, and fastned the Eyes of it to the Statue by so cunning 'Workmanship, that if any one were minded to take it away, 'he could not do it without breaking the Statue, and disorder-'ing the connection of the Work. After the same manner is 'God in the World, retaining and upholding the coherence 'of all things, and preserving the safety of the Universe: 'Onely, He is not in the midst of it (namely the Earth) 'which is a turbulent Region, but in the highest place, which 'is sutable to His Purity.

P. 103, 104. *Galen de Usu partium.*

'Our most wise Creator hath plac'd under the Foot a skin, 'not loose, or thin, or soft, but close, and of indifferent 'hardness and sense, to the end it might not easily suffer injury: 'To Him I compose these Commentaries as certain Hymns, 'esteeming Piety not to consist in Sacrificing many *Hecatombs* 'of Oxen to Him, or burning *Cassia*, and a thousand other 'Perfumes; but in this, first to know my self, and then to 'declare to others, what His Wisdom, Power, Providence 'and Goodness is: the ignorance of which, not the abstaining 'from Sacrifice, is the greatest Impiety. For I account it an 'evidence of most perfect goodness, that He hath furnish'd all 'things with convenient ornament, and deny'd His benefits

'to

'to none. Now, to have devis'd how all things might be 'handsomly fram'd, is the part of highest Wisdom; but to 'have made all things which he would, of insuperable Power.

P. 104. *Paracelsus de Mineral: Tract.* 1:

'God is very admirable in His Works; from the Contem-'plation of which we ought not to desist Night or Day, but 'continually be imploy'd in the inquisition of them. *For this is to walk in the ways of God.*

THe reason why the Author endeavours to posseſse Pyrophilus *with the true value of* Experimental Philoſophy. 1

That Experimental Philoſophy *is conducive to the improving of man's Underſtanding, and to the increaſing of man's power.* 2

Arguments to prove that Man's Curioſity for Knowledge is much thereby gratified. ibid.

A relation of the tranſport & ſurpriſal of a Maid born blind; when being about 18. *years old ſhe obteined the firſt ſight of the various Objects this world preſented her with.* 3

That the knowledg of the inward Architecture and contrivanecs of Nature is more delightfull then the ſight of the outward ſhapes. 4

Examples and Inſtances of the prevalence of the pleaſure that ariſes from the attainment of Knowledg. 4

That the knowledg of the moſt curious Artificial works is not more delightfull then the knowledg of Natural. 5. *That the delight herein is altogether inoffenſive.* 6

Inſtances of the Eſteem diverſe ancient Philoſophers had for it. 6, 7

How this ſtudy conſiſts with Religion. 8

The abſurdity of not imploying humane faculties on the contemplation of thoſe Objects to which they are fitted. 9. *Illuſtrated by the ſimilitude of a Spider in a Palace, taking notice of nothing beſides her own Cobweb.* 10

The Opinions that Seth, Abraham, Solomon, Ovid *had of man's fitneſſe for the ſtudy of Aſtronomy, and other Phyſiology.* 11

VVhy Providence might deprive us of Solomons *Phyſiology.* 11

Of the delight that may ariſe from the variety of Objects which Nature produceth. 12

That there be above 6000 *Subiects of the Vegetable Kingdom.* ib.

Of an excellent Jamaica *Pepper newly brought over.* ib.

How many Treatiſes are already made of Antimony, *which yet hath not been perfectly diſcovered.* 13

Of a real Mercury *of* Antimony. 14. *and a reall combuſtible* Sulphur *of* Antimony *that burns like ordinary Brimſtone.* 14

A new Tincture of Antimonial Glaſs, with the entire proceſs to draw it.

it. 14

Of Gilbertus, Cabeus, *and* Kircher, *who ſucceſsively writ the Experiments of the Loadſtone.* 15

Of ſome new Experiments hitherto undiſcoverd of that Stone. ib.

That admirable ſpeculations may ariſe from the moſt deſpicable productions of Nature. 16,17

What ever God has thought worthy of making, man ſhould not think unworthy of knowing. 18,19

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The Ends of God's Creation, his own Glory. 23,24

That Man's Good is a ſecond End, proved by Scripture. 25. *The ſame proved by Reaſon and Authority.* 26,27,28

How the Sun [Shemeſh] *is the great miniſter of the Univerſe.* 27,

That accommodation and delight which the Creatures might afford Man is much impaired by the want of Natural Philoſophie. 29

That the inſtructions to our Intellectual part are more conſiderable then the accommodations we have from Nature to our Animal part. ib.

Of the Hints of Natural Philoſophy in the Hiſtory of the Creation, and other references to it in other places. 30,31

How God's Power is conſpicuous in the Creatures. 32,33,34. *How God's wiſdome is conſpicuous in them.* 34

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OF THE

VSEFVLNESSE

OF

Naturall Philosophy.

The Second Part.

Of its Usefulness to promote the Empire of Man *over things* CORPOREAL.

OXFORD,
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THE

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OF

Natural Philosophy.

The Second Part.

OF THE VSEFVLNESSE OF Naturall Philosophy.

The Second Part.

The first SECTION.

Of it's Usefulness to PHYSICK.

OF THE

WORLD

OR

Natural Philosophy.

The Second Part.

ESSAY I.

Containing some Particulars tending to shew the Usefulness of Natural Philosophy to the Physiological part of Physick.

AFter having, in the former part of this Treatise, *Pyrophilus*, thus largely endeavored to manifest to you the advantagiousness of Natural Philosophy to the minde of Man, we shall now proceed to speak of its Usefulness, both to his Body and Fortune. For I must ingeniously confess to you, *Pyrophilus*, That I should not have neer so high a value as I now cherish for Physiology, if I thought it could onely teach a Man to discourse of Nature, but not at all to master Her; and served onely, with pleasing Speculations, to entertain his Understanding without at all increasing his Power. And though I presume not to judge of other Mens knowledge, yet, for my own particular, I shall not dare to think my self a true Naturalist, till my skill can make my Garden yield better Herbs and Flowers, or my Orchard better Fruit, or my

Fields better Corn, or my Dairy better Cheese then theirs that are strangers to Physiology. And certainly, *Pyrophilus*, if we seriously intend to convince the distrustful World of the real usefulness of Natural Philosophy, we must take some such course, as that *Milesian Thales* did, who was by the Antients reckoned among the very first of their Naturalists, and their seven celebrated Wise-men: Of this *Thales* it is reported, That being upbraidingly demanded what advantage the Professors of Astrology could derive from the knowledge of it; he Astrologically foreseeing what Year it would prove for Olives, before any wonted signs of it did appear to Husbandmen, Ingrossed, by giving earnest, the greater part of the Olives, which the next Season should afford to *Chios* and *Miletus*; And being thereby inabled, when most Men wanted Oyl, to sell his at his own rates, he made advantage enough of his skill, to let his Friends see, That Philosophers may have the acquisition of Wealth more in their power then in their aim.

Me thinks, it should be a disparagement to a Philosopher, when he descends to consider Husbandry, not to be able, with all his Science, to improve the precepts of an Art, resulting from the lame and unlearned Observations and Practice of such illiterate Persons as Gardeners, Plow-men, and Milk-maids. And indeed, *Pyrophilus*, though it be but too evident, that the barren Philosophy, wont to be taught in the Schools, have hitherto been found of very little use in humane Life; yet if the true Principles of that fertil Science were thorowly known, consider'd and apply'd, 'tis scarce imaginable, how universal and advantagious a change they would make in the World: For in Man's knowledge of the nature of the Creatures, does principally consist his Empire over them. (his Knowledge and his Power having generally the same limits) And as the Nerves, that move the whole Body,

Body, and by it, that great variety of Engines imployed by Man on his manifold occasions, proceed from the Brain; so all the operations, by which we alter Nature and produce such changes in the Creatures, flow from our knowledge of them. Theological inquiries excepted, there is no Imployment wherein Mankinde is so much and so generally concern'd, as 'tis in the study of Natural Philosophy. And those great Transactions which make such a noise in the World, and establish Monarchies or ruine Empires, reach not to so many Persons with their influence, as do the Theories of Physiology.

To manifest this Truth, we need but consider, what changes in the Face of things have been made by two Discoveries, trivial enough; the one being but of the inclination of the Needle, touched by the Load-stone, to point toward the Pole; the other being but a casual Discovery of the supposed antipathy between Salt-Peter and Brimstone: For without the knowledge of the former, those vast Regions of *America*, and all the Treasures of Gold, Silver, and Precious Stones, and much more Precious Simples they send us, would have probably continued undetected; And the latter, giving an occasional rise to the invention of Gunpowder, has quite alter'd the condition of Martial Affairs over the World, both by Sea and Land. And certainly, true Natural Philosophy is so far from being a barren speculative Knowledge, that Physick, Husbandry, and very many Trades (as those of Tanners, Dyers, Brewers, Founders, *&c.*) are but Corollaries or Applications of some few Theorems of it.

If I had not a great respect for the Great *Hippocrates*, I should venter to say, That some of those rigid Laws of *Draco* (whose severity made Men say, That they were written in Blood) have, perhaps, cost fewer Persons their Lives, then that one Aphorism of *Hippocrates*, which teaching, *That if a*

teeming Woman be let Blood, she will miscarry, has for divers Ages prevail'd with great numbers of Physitians, to suffer multitudes of their Female-Patients to die under their hands, who might propably have been rescued by a discreet Phlebotomy, which experience has assured us (whatever the close of * the Aphorism says to the contrary) to have been sometimes not onely safely, but usefully employed, even when the Infant is grown pretty big. But my respect for so great a Person as *Hippocrates*, makes me content it should be thought, That till of late, Physitians have for the most part mistaken their Dictators meaning in this Aphorism, provided it be granted me, That through this mistake numbers of teeming Women have been suffered to perish, who might probably, by the seasonable loss of some of their Blood, have prevented that of their Lives.

* *Hippo. Apho* 31. *lib.* 5. Γυνὴ ἐν γαστρὶ ἔχουσα, Φλεβοτομηθεῖσα ἐκτιτρώσκει· καὶ μᾶλλον εἰ μεῖζον εἴη τὸ ἔμβρυον.

And if an Error, which occasion'd onely a fault of omission, hath been so prejudicial to Man-kinde, I suppose you will readily grant that those Errors of Physitians, that are apt to produce faults of commission, and rash attempts, may prove much more hurtful. And so much I finde to be acknowledg'd by *Galen*, in that honest and excellent Passage of his, in his Comment upon the Aphorisms, where having mention'd the danger of trying conclusions upon Men, by reason of the nobleness of the Subject; and having added, That the Physitians Art is not like that of a Potter, a Carpenter, or the like, where a Man may freely try what he pleases to gratifie his curiosity, or satisfie himself about his Notions, because that if he spoils (for instance, the Wood he works on, no Body is indanger'd by his miscarriage: He thus concludes, *In corpore autem Humano ea tentare, quæ non sunt experientium comprobata periculo non vacat; cùm temerariæ experientiæ finis sit totius Animantis internecio.*

Comment: in Aph: 1. lib. 1.

And indeed, since the Physitian borrows his Principles of the

the Naturaliſt, I cannot but ſomewhat admire to ſee divers Perſons, who are by themſelves and others thought ſuch wiſe Men, think the ſtudy of Natural Philoſophy of ſmall concernment: for when by their Policy or good Fortune they have acquired never ſo much Wealth or Power, and all other tranſitory Goods, and are bleſt with Children to inherit them, if the Principles of Natural Philoſophy be miſ-laid, we oftentimes ſee the ignorance or the miſtake of a Doctor, deprive them of all at once, and ſhew how dangerous it is to be ſollicitous of the means of attaining the accommodations of Life, with the contempt of that Knowledge which in very many caſes is humanely neceſſary to the preſervation of Life it ſelf.

But, *Pyrophilus*, though our unintended prolixity in the former part of our Diſcourſe concerning the Uſefulneſs of Phyſiology, oblige us to the greater brevity in this latter part of it; yet to ſhew you, That of the two things, which you may remember we told you *Pythagoras* pronounc'd moſt God like in Man (*The Knowledge of Truth, and the Doing of Good*) Phyſiology as well qualifies us for the latter, as it inriches us with the former. It will not be amiſs a little more particularly (though as ſuccinctly as ſo copious a Subject will permit) to conſider the probability there is that no ſmall Improvement may be made by Mens proficiency in Experimental Knowledge of thoſe Arts which are the chiefeſt Inſtruments of Man's dominion over the Creatures. Theſe Arts (to divide them not accurately, but popularly) do ſerve either to relieve Man's neceſſities, as Phyſick and Husbandry; or for his accomodation, as the Trades of Shoo-makers, Diers, Tanners, *&c.* or for his delight, as the Trades of Painters, Confectioners, Perfumers, *&c.* to all which Arts, and many others ally'd to them, Philoſophical Experiments and Obſervations,

ſervations, may, by a knowing Naturaliſt, be made to extend a meliorating Influence.

If I ſhould, *Pyrophilus*, ſay this, without offering any thing at all by way of Proof that I ſay it not inconſideratly, You would, I fear, believe, that I deliver it too ſlightly for a Matter of that moment: And if, on the other ſide, I ſhould in this Diſcourſe preſent to you all the Particulars that I think I could, without Impertinency, employ to countenance what I have ſaid, it would ſwell this Treatiſe to a Volumn, and defraud divers of my other Eſſays. And therefore I hold it not unfit to chooſe a middle way, and ſet down, on this occaſion, either onely or chiefly thoſe things which do the moſt readily occur to me, and do not ſo properly belong to the reſt of my phyſiological papers. And to avoid Confuſion, I ſhall, according to the Diviſion newly propoſ'd, employ one Section of this Second part of the preſent Treatiſe, in ſetting down ſuch things as relate to the Improvement of Phyſick: And in the other Section, deliver ſuch particulars as concern thoſe other uſeful Arts that depend upon Natural philoſophy. But in regard that (as I have already intimated) the following Diſcourſe is to conſiſt chiefly of thoſe things that belong not to any of my other Eſſays, You will not, I preſume, expect that I ſhould handle any ſubject fully or Methodically on this occaſion: Which warning I eſpecially intend for that part of the enſuing Diſcourſe that relates to phyſick. For you will eaſily believe, that I am far from pretending to be a Doctor in that Faculty: And accordingly, in this and the four following Eſſays, I ſhall onely throw together divers ſuch particulars as not belonging to my Writings, would, perhaps be loſt, if I did not lay hold on this Opportunity for their preſervation, of which they are not altogether judged unworthy by ſome knowing Men, whoſe Encouragements, to mention them to you, have diſſwaded me from wholly paſſing by, in this Diſcourſe,

course Matters properly Medical, what scruples soever I had to venture at speaking of them, Especially since I have not now the Conveniency to furnish these Essays with divers Particulars (by some thought not inconsiderable) which I may, perhaps be invited to adde to them hereafter, if I finde by your Reception of these that the others are like to be welcome.

To say something then of Physick, and to suppose the fitness of the now receiv'd division of it into five Parts: The Physiological (the Physitian taking that in a stricter sense then Philosophers, and then we do every where, save in this Essay) Pathological, Semeiotical, Hygieinal and Therapeutical, let us briefly take notice how each of these is indebted to, or capable of being improved by experienc'd Naturalists. And indeed, such is the affinity between Natural Philosophy and Physick, or the dependance of this on that, that we need not wonder at the judicious Observation of *Aristotle*, where he thus writes, *Naturalium ferè plurimis & Medicorum, qui magis Philosophicè artem prosequuntur, illi quidem finiunt ad ea, quæ de Medicina; hi verò ex iis quæ de Natura, incipiunt quæ de Medicina.* But we must instance these things more particularly: And first for Physiology, 'tis apparent, That the Physitian takes much of his Doctrine in that part of his Art from the Naturalist: And to mention now no other parts of Physiology, in its stricter acception, the experience of our own age may suffice to manifest, what light the Anatomical doctrine of Mans Body may receive from Experiments made on other subjects. For since it were too barbarous, and too great a violation of the Laws, not onely of Divinity but Humanity, to dissect humane Bodies alive, as did *Herophilus* and *Erasistratus*, who (as I finde in some of the Ancients) obtain'd of Kings the Bodies of Malefactors for that purpose, and scrupled not to destroy Man to know him; And since, nevertheless divers things in Anatomy, as particularly the motion of

Arist. lib. de sensu & sensili, cap. 1.

the Blood and Chyle cannot be discover'd in a dead dissected Body (where the cold has shut up and obliterated many Passages) that may be seen in one open'd alive; it must be very advantagious to a Physitians Anatomical knowledge, to see the Dissections of Dogs, Swine, and other live Creatures, made by an inquisitive Naturalist: Consonantly whereunto we may remember, that the discoveries of the milky Vessels in the Mesentery by *Asellius*, of those in the *Thorax* by *Pecquet*, and of the *Vasa Limphatica* by *Bartholinus*, were first made in Brute Bodies, though afterwards found to hold in humane ones. Nor is it a small convenience to the Anatomist, that he may in the Bodies of Bruits make divers instructive Experiments, that he dares not venture on in those of Men; as for instance, that late noble, and by many not yet credited Experiment of taking out the Spleen of a Dog without killing him: For that this Experiment may be very useful, we may elsewhere have occasion to shew. And that it is possible to be safely made (though many, I confess, have but unprosperously attempted it, and it hath been lately pronounced impossible in Print) our selves can witness. And because I have not yet met with any Author that professes himself not to relate this Experiment (of the exemption of a Dogs Spleen) upon the credit of others, but as an eye-witness; I am content to assure you, That that dextrous Dissector, Dr *Jolive* (of whom we formerly made mention) did the last Year, at my request, take out the Spleen of a yong Setting-dog I brought him: And that it might not be pretended, the Experiment was unfaithfully or favorably made, I did part of it my self, and held the Spleen (which was the largest in proportion to his Body that ever I saw) in my Hand, whil'st he cut assunder the Vessels, reaching to it, that I might be sure there was not the least part of the Spleen left unextirpated, and yet this Puppy, in less then a Fortnight, grew not onely well, but as sportive

ſportive and as wanton as before: which I need not take pains to make you believe, ſince you often ſaw him at your Mothers Houſe, whence at length he was ſtol'n. And though I remember the famous Emperick *Fiorouanti*, in one of his *Italian* Books, mentions his having been prevail'd with by the importunity of a Lady (whom he calls *Marulla Greca*) much afflicted with Splenetick diſtempers, to rid her of her Spleen; and addes, That ſhe out-liv'd the loſs of it divers Years. Yet he that conſiders the ſituation of that part, and the conſiderableneſs of the Veſſels belonging to it in humane Bodies, will probably be apt to think, that though his relation may be credited, his venturouſneſs ought not to be imitated. The Experiment alſo of detaining Frogs under Water for very many hours (ſometimes amounting to ſome days) without ſuffocation, may, to him that knows that Frogs have Lungs and Breath as well as other Terreſtrial Animals, appear a conſiderable diſcovery, in order to the determining the Nature of Reſpiration. Beſides, the ſcrupulouſneſs of the Parents or Friends of the deceaſed Perſons, deprives us oftentimes of the Opportunities of Anatomizing the Bodies of Men, and much more thoſe of Women, whereas thoſe of Beaſts are almoſt always and every where to be met with. And 'twas, perhaps, upon ſome ſuch account, that *Ariſtotle* ſaid that the external parts of the Body were beſt known in Men, the internal in Beaſts, *Sunt enim* (ſays * he, ſpeaking of the inward parts) *hominum imprimis incertæ atq; incognitæ: quamobrem ad cæterorum animalium partes quarum ſimiles ſunt humanæ referentes eas contemplari debemus.* And queſtionleſs in many of them, the frame of the parts is ſo like, that of thoſe anſwerable in Men, that he that is but moderately skill'd in Andratomy (as ſome of the Moderns call the Diſſection of Mans Body, to diſtinguiſh it from Zootomy, as they name the Diſſections of the Bodies of other Animals) may, with due dili-

* *Ariſt. Hiſt. Ani. lib. 1. cap. 16.*

gence and industry, not despicably, improve his Anatomical knowledge. In confirmation of which truth, give me leave to observe to you, That though *Galen* hath left to us so many, and by Physitians so much magnified Anatomical Treatises, yet not onely divers of those Modern Physitians, that would eclipse his Glory, deny him to have learn'd the skill he pretends to, out of the inspection of the Dissected Bodies of Men or Women, or so much as to ever have seen a humane Anatomy. But I finde even among his Admirers, Physitians that acknowledge that his Knives were much more conversant with the Bodies of Apes, and other Bruits, then with those of Men, which in his time those Authors say 'twas thought little less then Irreligious, if not Barbarous, to mangle; which is the less to be wondred at, because even in this our Age, that great People of the Muscovites, though a Christian and European Nation, hath deny'd Physitians the use of Anatomy and Skeletons; the former, as an inhumane thing; the latter, as fit for little but Witchcraft, as we are inform'd by the applauded Writer *Olearius*, Secretary to the Embassy lately sent by that Learned Prince, the present Duke of *Holsteine*, into *Moscovia* and *Persia*. And of this, the same Author gives us the instance of one *Quirin*, an excellent *German* Chyrurgion, who, for having been found with a Skeleton, had much adoe to scape with his Life, and was commanded to go out of the Kingdom, leaving behinde him his Skeleton, which was also dragg'd about, and afterwards burnt.

Voyage de Muscovie & de Perse, pag. 128

To these things we may adde, *Pyrophilus*, that the diligence of Zootomists may much contribute to illustrate the Doctrine of *Andratomy*, and both inform Physitians of the true use of the parts of a humane Body, and help to decide divers Anatomical Controversies. For as in general 'tis scarce possible to learn the true Nature of any Creature, from the con-

consideration of the single Creature it self: so particularly of divers parts of a humane Body 'tis very difficult to learn the true use, without consulting the Bodies of other Animals, wherein the part inquired after is by Nature either wholly left out as needless, or wherein its differing bigness, or situation, or figure, or connection with, and relation to other parts, may render its use more conspicuous, or at least more discernable.

This Truth may be somewhat illustrated by the following Observations, which at present offer themselves to my thoughts upon this occasion.

The Lungs of Vipers, and other Creatures (whose Hearts and whose Blood, even whil'st it circulates, we have always found, as to sense, actually cold) may give us just occasion to inquire a little more warily whether the great use of Respiration be to cool the Heart.

The suddain falling and continuing together, which we may observe in that part at least of a Dogs Lungs, that is on the same side with the Wound, upon making a large Wound in his Chest, though the Lungs remain untouched, is a considerable Experiment, in order to the discovery of the principal Organ of Respiration.

If you dexterously take out the Hearts of Vipers, and of some smaller Fishes, whose coldness makes them beat much more unfrequently and leisurely, then those of warm Animals, the contraction and relaxation of the Fibres of the Heart may be distinctly observed, in order to the deciding or reconciling the Controversie about the cause and manner of the Hearts motion, betwixt those Learned modern Anatomists, that contend, some of them, for Dr. *Harvey*'s Opinion; and others, for that of the Cartesians.

Towards satisfying my self in which difficulty, I remember, I have sometimes taken the Heart of a Flownder, and having cut it transversly into two parts, and press'd out, and

with

with a Linnen cloth wip'd off the Blood contain'd in each of them, I obſerv'd, that for a conſiderable ſpace of time, the ſever'd and bloodleſs parts held on their former contraction and relaxation. And once I remember that I obſerved, not without Wonder, That the ſever'd portions of a Flownders Heart, did not onely, after their Blood was drain'd, move as before, but the whole Heart, obſerv'd for a pretty while, ſuch a ſucceſſion of motion in its divided and exſanguious pieces, as I had taken notice of in them whil'ſt they were coherent, and as you may with pleaſure both ſee and feel in the intire Heart of the ſame Fiſh.

Some of the other Controverſies agitated among Anatomiſts and Philoſophers, concerning the uſe of the Heart, and concerning the principal ſeat of Life and Senſe, may alſo receive light from ſome ſuch Experiments, that we made in the Bodies of Bruits, as we could not of Men.

And the firſt of theſe that we ſhall mention, ſhall be an Experiment that we remember our ſelves formerly to have made upon Frogs: For having open'd one of them alive, and carefully cut out his Heart, without cloſing up the Orifice of the Wound (which we had made wider then was neceſſary) the Frog notwithſtanding leaped up and down the Room as before, dragging his Entrals (that hung out) after him; and when he reſted, would upon a puncture leap again, and being put into the Water, would ſwim, whil'ſt I felt his Heart beating betwixt my Fingers. The Hearts of others of them were taken out at an Inciſion, no greater then was requiſite for that purpoſe; when we had ſtitched or pin'd up the Wound, we obſerv'd them to leap more frequently and vigorouſly then the former: They would, as before they were hurt, cloſe and open their Eye lids upon occaſion: Being put into a Veſſel not full of Water, they would as orderly diſplay their fore and hinder Legs in the manner requiſite to ſwimming, as if they

they wanted none of their parts, especially not their Hearts; they would rest themselves sometimes upon the surface of the Water, sometimes at the bottom of it, and sometimes also they would nimbly leap, first out of the Vessel, and then about the Room, surviving the exsection of their Hearts; some about an hour, and some longer. And that which was further remarkable in this Experiment, was, that we could, by gently pressing their Brest and Belly with our Fingers, make them almost at pleasure make such a noise, as to the Bystanders made them seem to croak; but how this Experiment will be reconcil'd to the Doctrine ascrib'd to Mr. *Hobs*, or to to that of the *Aristotelians*, who tell us, That their Master taught, the Heart to be the seat of Sense (whence also though erroneously, he made it the original of the Nerves) let those that are pleas'd to concern themselves to maintain all his Opinions, consider.

And whereas Frogs, though they can move thus long without the Heart, yet they cannot at all bear the exemption or spoiling of the Brain; we will adde what we have observ'd, even in hot Animals, whose Life is conceived to be much more suddenly dissipable, and the motion of each part much more dependent upon the influence of the Brain: We open'd then an Egge, wherein the Chick was not onely perfectly formed, but well furnished with Feathers, and having taken him out of the Membrane that involved him, and the Liquors he swam in, and laid him on his Back on a flat piece of Glass, we clip'd away, with a pair of Scissers, the Head and the Brest-bone; whereby the Heart became exposed to view, but remain'd fastned to the Headless Trunk: and the Chick lying in this posture, the Heart continued to beat above a full hour, and the Ears seem'd to retain their motion a pretty while after the Heart it self had lost his; the motion of none of the other Parts appearing many moments to survive the loss of the Head:

Head: and which is moſt conſiderable, the ſeemingly dead Heart was divers times excited to new, though quickly ceaſing motion, upon the puncture of a Pin, or the point of a Pen-knife. And to evince that this was no caſual thing, the next Day we dealt with the Chick of another Egge, taken from the ſame Hen, after the above recited manner; and when the motion of the Heart and Ears began to ceaſe, we excited it again, by placing the Glaſs over the warm ſteam of a Veſſel full of hot Water, bringing ſtill new Water from off the Fire to continue the heat, when we perceiv'd the former Water to begin to cool; and by this means we kept the Heart beating for an hour and an half by meaſure. And at another time, for further ſatisfaction, we did, by theſe and ſome other little induſtries, keep the Heart of a ſomewhat elder Chick, though expoſed to the open Air, in motion, after we had carefully clipt off the Head and Neck, for the ſpace of (if our memory do not much miſ-inform us) two hours and an half by meaſure. Upon what conjectures we expected ſo laſting a motion in the Heart of a Chick, after it had loſt the Head, and conſequently the Brain, would be more tedious and leſs fit to be mention'd in this place, then the ſtrange vivacity we have ſometimes, not without wonder, obſerved in Vipers: Since not onely their Hearts clearly ſever'd from their Bodies may be obſerv'd to beat for ſome hours (for that is common with them to divers other cold Animals) but the Body it ſelf may be ſometimes two or three days after the Skin, Heart, Head, and all the Entrals are ſeparated from it, ſeen to move in a twining or wrigling manner: Nay (what is much more) may appear to be manifeſtly ſenſible of punctures, being put into a freſh and vivid motion, when it lay ſtill before, upon the being pricked, eſpecially on the Spine or Marrow with a Pin or Needle.

And though Tortoiſes be in the Indies many of them very large

large Animals, yet that great Traveller, *Vincent le Blanc*, in his French Voyages, giving a very particular account of those Tortoyses, which the East Indian King of *Pegu* (who was much delighted with them) did, with great curiosity, cherish in his Ponds, adds this memorable Passage as an Eye-witness of what he relates: *When the King hath a minde to eat of them, they cut off their heads, and five days after they are prepar'd; and yet after those five days they are alive, as we have often experienc'd.* Now although I will not say, that these Experiments prove, that either 'tis in the Membranes that sensation resides (though I have sometimes doubted whether the Nerves themselves be not so sensible, chiefly as they are invested with Membranes) or that the Brain may not be confined to the Head, but may reach into the rest of the Body, after another manner then is wont to be taught: Yet it may be safely affirm'd, that such Experiments as these may be of great concernment, in reference to the common Doctrine of the necessity of unceasing influence from the Brain, being so requisite to Sense and Motion, especially if to the lately mention'd Particulars we adde on this occasion what we have observ'd of the Butter-flies, into which Silk-worms have been Metamorphosed; namely, That they may not onely, like common Flys, and divers other winged Insects, survive a pretty while the loss of their Heads, but may sometimes be capable of Procreation after having lost them: as I not long since tryed (though not perhaps without such a Reluctancy as *Aristotle* would have blam'd in a Naturalist) by cutting off the Heads of such Butter-flies of either Sex. *Quamvis enim Mas cui prius amputatum est caput nequaquam adduci posset (quæcunq; Insecti illius est salacitas) ut Fœminam comprimeret: Decollata tamen Fœmina marem alacriter admisit. Et licet post horas aliquot coitu insumptas ita requierit immota ut mortuam per multas horas cogitarem; non solum quia omnem penitus mo-*

tum perdiderat, & in Thorace satis magnum apparebat foramen, quod à parte aliqua Corporis simul cum capite à trunco disruptâ factum videbatur; verum etiam quoniam eodem permansit statu idq; per plures horas, ultra tempus quo, post coitionem cum Mare hujus generis Animalcula solent ordiri prolificationem. Tandem vero postquam jam diu de Vita ejus desperatum esset, Ova fœtare tam confertim cœpit ut vel exiguo temporis intervallo eorum plura in manu mea deponeret. An vero Prolifica sint futura nondum comperi.

Their Opinion that ascribe the redness of the Blood to the colour of the Liver, through which it passes, is not discountenanced by the Livers of Men: But in Hen-eggs, about the third or fourth day after incubation (for we have found the circumstances of time much to vary) you may observe the *Punctum saliens*, or Heart, to be ever and anon full of conspicuously red Blood, before the naked Eyes can so much as discern a Liver, at least before they can discover in it any redness; a yellowness being all I could observe in the *Parenchyma* of the Livers of divers Chickens perfectly form'd, and furnish'd with Feathers, though not great enough to make their way out of the Shell. And in divers great Fishes I have found the Vessels of the Liver full of very red Blood, though the *Parenchyma* or substance of it were white, or at least did not at all participate much less impart a sanguine colour.

The Doctrine so unanimously delivered by Physitians and Chirurgions, concerning the irreparable loss of the Limb of an Animal, once violently severed from the Body, will appear unfit to be admitted, without some restriction by what may be experienc'd in Lizards, in Lobsters and Craw-fishes, and perhaps in some other living Creatures. For of Lizards it hath been often observ'd in hot Countreys, and even in *France*, that their Tails being struck off will grow again. And the like hath been of old observ'd by *Pliny*, and the experienc'd

Bontius

Bontius delivers it upon his own knowledge in these words: *Hoc in domesticis meis non semel animadverti dum filioli mei lusitabundi bacillo caudas iis decutiebant, quas tamen post diem unum aut alterum ad solitum pabulum revertentes vidi, caudasq; iis paulatim reaccrescere.*

That the Claws likewise of Lobsters being torn off, another will sometimes grow in the room of it, is not onely said by Fisher-men, but hath been affirmed to me by very credible persons, one of which assured me, that he himself had observed it very often. And I am the more apt to believe it, because the like is to be met with among Craw-fishes, which are so like Lobsters, that by many they are taken (though not considerately enough) to be but a smaller kinde of them. For I remember, that going to look upon a Repository where a multitude of them was kept, and causing divers of the fairest to be drawn up, that I might take the stony concretions, commonly called *Oculi Cancrorum*, out of their Heads I observ'd one large Fish that had one of his Claws proportionable to the bulk of his Body, but the other so short and little, that the greater seem'd to be four or five times as big as it; whereupon its good shape and fresh colour, seeming to argue it to be but yong and growing, invited me to ask one of them that had the oversight of the Fish, whether he had formerly seen any Claws torn off to grow again; he affirmed to me, That in that sort of Fish it was very usual.

I could also tell you how fruitlesly I have indeavored to discover that stomachical Acidity, to which many of our Modern Physitians are pleas'd to ascribe the first digestion of the Nutriment of Animals, in the purposely dissected Stomachs of ravenous Sea-fishes, in whose Stomachs, though our taste could not perceive any sensible acidity, yet we found in one of them a couple of Fishes, each of them about a Foot long, whereof the one, which seem'd to have been but newly de-

voured, hath ſuffered little or no alteration in the great Fiſhes Stomach; but the other had all its outſide, ſave the Head, uniformly waſted to a pretty depth, beneath the former ſurface of the Body, and look'd as if it had been not boil'd, or wrought upon by any conſiderable heat, but uniformly corroded, like a piece of Silver Coyn kept a while in *Aqua-fortis*, according to the criminal tricks of Adulterators of Money.

Yet I am loth, till I have perfected what I deſign in order to that enquiry, either to imbrace or reject the Opinion I finde ſo general among the Moderns, concerning the Solution of Meat in the Stomach by ſomething of Acid. And I remember, that when I was conſidering what might be alleadg'd for, as well as againſt that Opinion, I deviſ'd this Experiment, among others, in favor of it: I provided a Liquor, with which I drench'd a piece of the Wing of a roſted Pullet, having firſt well cruſhed it between my Fingers, to make ſome amends for the omiſſion of chewing it; and having a little incorporated the Liquor and the muſculous Fleſh, they immediately chang'd colour, and in about an hour, grew to be a kinde of Gelly, in colour and conſiſtence not unlike Quince Marmalade: This mixture, by the next Morning, did, as I expected, turn to a deep Blood red, or ſometimes rather a lovely purple Liquor, though all this while there had been no external heat imployed to promote the action of the *Menſtruum*. And the like Experiment I tryed alſo with a piece of Mutton, with Bread, and a piece of Veal, and other edible things, which at that time occur'd to me, and found the operation of the Liquor almoſt uniform, though it ſeem'd to act moſt effectually upon Fleſh. And to gratifie in ſome meaſure your curioſity, *Pyrophilus*, I am content to tell you, that the *Menſtruum* was drawn from Vitriol, and that with the bare Oyl of it I have (though I could not with *Aqua fortis*) perform'd no leſs then what I have yet mention'd; but

but least this should be thought a digression, let it suffice to have, on this occasion, mention'd thus much upon the by.

To what we lately took notice of concerning the Heart, may be added, That on the Sea-coast of *Ireland*, I observ'd a sort of Fishes, about the bigness of Mackrels, whose Hearts were of an inverted Figure, compar'd to those of other Animals, the basis or broad end of the Heart being nearest the Tail, and the accuminated part or apex being coherent to the great Artery, and respecting the Head.

To all these trifling Observations, divers more considerable ones might be added, but they may be more seasonably insisted on elsewhere; and those already mention'd, may suffice to let you see, That the Naturalist by his Zootomy, may be very serviceable to the Physitian in his Anatomical Inquiries.

Nor is it onely by the dissection of various Animals, that the Naturalist may promote the Anatomists knowledge, but perhaps also he may do it by devising ways to make the dead Bodies of Men, and other Animals, keep longer then naturally they would do: For since experience teaches us, That Men finde it very easie to forget the originations, windings, branchings, insertions, and other circumstances of particular Vessels, and other parts of the Body, as well as those that study Botanicks, are wont to complain of their easie forgetting, the shapes, differences, and alterations of smaller Plants, it cannot but be a great help to the Student of Anatomy, to be able to preserve the parts of humane Bodies, and those of other Animals, especially such Monsters as are of a very singular or instructive Fabrick, so long that he may have recourse to them at pleasure, and contemplate each of them so often and so considerately, till he have taken sufficient notice of the shape, situation, connection, *&c.* of the Vessel, Bone, or other part, and firmly impress'd an *Idea* of it upon his memory. We finde our selves much help'd to retain in our memo-

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ry, the figures and differences of Vegetables, by those Books which some curious Botanists make, wherein the Plants themselves, artificially dry'd, are display'd upon, and fastned to Leaves of white Paper; if it were not for one of those Books, wherein I have in one vast Volumn almost all the Plants of one of the chief Physick-gardens in *Europe*, I should every Year forget, by the end of Winter, to know again most of the smaller Plants I had learn'd to take notice of in the Spring. And by the way 'tis observable, how long Plants, by being carefully indeed, but barely dryed in the shade betwixt Sheets of Paper, which help to soak up the superfluous moisture, may be preserv'd. For I have divers Years had an Herbal, wherein several of the Flowers, and other Plants, retain their native yellow and blue, *&c.* (but somewhat faint) though by the date it appear'd to be 22 or 23 Years old. And I am apt to think, that it would be very possible for Anatomists also to preserve the Bodies they contemplate for a considerable time: For experience hath inform'd us in good number of such Animals, that Butter-flies, and divers other flying Insects, may have their shape and colours preserv'd, I know not how long, by running them through in some convenient part with Pins, and therewith sticking them to the inside of large Boxes. And on this occasion, I remember, that having sometimes reflected upon the Lasting of Spiders, Flys, and other small living Creatures, that having been casually enclos'd in Amber whil'st it was soft, are ever preserv'd entire and uncorrupted, I thought it not amiss to try whether some Substance, like Amber (at least as to the newly mention'd use of it) might not easily be prepar'd by Art: And hereupon I quickly found, that by taking good clear *Venice* Turpentine, and gently evaporating away about a third part of it (sometimes more, sometimes less, according to the exigency of my particular purpose) I could make a reddish Gum, diaphanous and without Bubbles, which

which would melt with a very gentle heat, and easily (being suffer'd to cool) become again so hard as to be brittle. This resinous Substance should be melted with as little heat as is possible (and therefore should be first pouder'd) that the texture of the Vegetable or Animal Bodies to be cased over with it, might receive the less alteration: And when it is brought to the requisite degree of fluidity, then the Body to be preserv'd (being, if that be needful, stuck through with a Pin) must be gently plung'd into it, and presently taken out and suffer'd leisurely to cool, being turn'd, from time to time, this way or that way, if there be occasion, that the investing Matter may be every where of an equal thickness upon it. And if at the first time the Case be not thick enough, it may again, when it is cold, be immers'd into the liquid Matter (as Chandlers are wont to thicken their Candles, by dipping them frequently into melted Tallow) of which some will every way adhere to it. And though these Cases be inferior to Amber, in regard of their being more apt to be sulli'd by dust, or otherwise; yet that inconvenience may be easily remedy'd, by keeping them shut up in Glasses or Boxes, at those times when one hath not occasion to consider them: And their clearness (especially if they be thin) and their smooth surfaces, together with their exactly keeping out the Air from the Body they enclose, may, perhaps, make so cheap and easie an Experiment a not unwelcome trifle, especially considering how easily 'tis capable of Improvement.

But to return to the Preservation of more bulky Bodies, 'tis a known thing, to the Collectors of Rarities, that the external *Idea* of Fishes, Crocodiles, Birds, and even Horses, may be preserv'd for many Years, by taking out the more corruptible parts, and stuffing their prepar'd Skins with any convenient Matter. And that the internal membranous parts of Bodies may be long and easily kept from putrefaction, is not unknown

unknown to many Anatomists. And not to mention what we have try'd of this sort, we have seen the Veins, Arteries, and Nerves of a humane Body, laid out in their natural situation upon three Boards, by the pains and skill of an accurate Anatomist of *Padua*. And elsewhere, *Uterum vidimus atq; omnia mulieris genitalia*, together with the Bladder, all displaid upon a Board, preserv'd for many Years so entire, and in a situation so near the Natural, that this Scheme was far more instructive, then the most accurate Printed one could possibly be. We have likewise known the flesh of Vipers, kept not onely sweet, but efficacious, for divers Years, by the smoak of a peculiar Powder, chiefly consisting of Aromatick Ingredients, and of which, you, *Pyrophilus*, may command the Composition.

We have also seen the Skeleton of a Monky, made, by an excellent French Chyrurgion of our acquaintance, whereon the Tendons and Fibres of the Muscles were so preserv'd, that it was look'd upon as a rarity, very useful to shew their Originations and Insertions, and to explain the motions of the Limbs: And perhaps there may be some way to keep the Arteries & the Veins too, when they are empty'd of Blood, plump, and unapt to shrink over-much, by filling them betimes with some such substance, as, though fluid enough when it is injected to run into the Branches of the Vessels, will afterwards quickly grow hard. Such may be the liquid Plaister of burnt Alabaster, formerly mention'd, or Ising-glass steeped two days in Water, and then boild up, till a drop of it in the cold will readily turn into a still Gelly. Or else *Saccarum Saturni*, which, if it be dissolv'd often enough in Spirit of Vinager, and the Liquor be each time drawn off again, we have observ'd to be apt to melt with the least heat, and afterwards to grow quickly into a somewhat brittle consistence again. But I must not insist on these Fancies, but rather adde, That I have known an

Embrio,

Embrio, wherein the parts have been very perfectly delineated and distinguishable, preserv'd unputrifi'd for several Years; and I think it still continues so, by being seasonably and artificially embalm'd with Oyl (if I much mis-remember not) of Spikes. And I have elsewhere seen a large *Embrio*, which after having been preserv'd many Years, by means of another Liquor (whose composition I do as yet but guess at) did, when I saw it, appear with such an admirable Entireness, Plumpness, and Freshness, as if it were but newly dead: And that which concurs to make me hope that some nobler way may be yet found out, for, the preservation of dead Bodies, is, that I am not convinc'd that nothing can powerfully resist Putrefaction in such Bodies, but things that are either saline and corrosive, or else hot; nor that the Embalming Substances cannot be effectually apply'd, without ripping open the Body to be preserv'd by them. For *Josephus Acosta*, a sober Writer, relates, That in certain *American* Mountains, Men, and the Beasts they ride on, sometimes are kill'd with the Winds, which yet preserve them from putrefaction, without any other help. So insensible a quantity of Matter, such as it may be, may, without Incision made into the Body, both pervade it, and as it were Embalm it. I know also a very experienc'd and sober Gentleman, who is much talk'd off for curing of Cancers in Womens Breasts, by the outward Application of an Indolent Powder; some of which he also gave me, but I have not yet had the opportunity to make tryal of it: And I shall anon tell you, that I have seen a Liquor, which without being at all either acid or caustick, is in some Bodies far more effectual against Putrefaction, then any of the corrosive Spirits of Nitre, Vitriol, Salt, *&c.* and then any of the other saline Liquors that are yet in use. We have also try'd a way of preserving Flesh with Musk, whose effects seem'd not despicable to us, but must not here be insisted on.

Nor were it amiſs that diligent Tryal were made what uſe might be made of Spirit of Wine, for the Preſervation of a humane Body: For this Liquor being very limpid, and not greaſy, leaves a clear proſpect of the Bodies immerſ'd in it; and though it do not fret them, as Brine, and other ſharp things commonly employ'd to preſerve Fleſh are wont to do, yet it hath a notable Balſamick Faculty, and powerfully reſiſts Putrefaction, not onely in living Bodies (in which, though but outwardly apply'd, it hath been found of late one of the potenteſt Remedies againſt Gangrens) but alſo in dead ones. And I remember that I have ſometimes preſerv'd in it ſome very ſoft parts of a Body for many Moneths (and perhaps I might had done it for divers Years, had I had opportunity) without finding that the conſiſtence or ſhape was loſt, much leſs, that they were either putrifi'd or dry'd up: We have alſo, by mixing with it Spirit of Wine, very long preſerv'd a good quantity of Blood, ſo ſweet and fluid, that 'twas wondered at by thoſe that ſaw the Experiment. Nay, we have for curioſity ſake, with this Spirit, preſerv'd from further ſtinking, a portion of Fiſh, ſo ſtale, that it ſhin'd very vividly in the dark; in which Experiment, we alſo aim'd at diſcovering whether this reſplendent quality of the decaying Fiſh would be either cheriſh'd, or impair'd by the Spirit of Wine (whoſe operations in this tryal we elſewhere inform you of) and it would be no very difficult matter for us to improve, by ſome eaſie way, this Balſamical Virtue of Spirit of Wine, in caſe you ſhall think it worth while: But not to anticipate what I may more properly mention to you elſewhere, I ſhall at preſent ſay no more touching the Conſervation of Bodies, ſince probably by all theſe, and ſome other Particulars, we may be induc'd to hope ſo well of humane Induſtry, as not to diſpair, that in time ſome ſuch way of preſerving the Bodies of Men, and other Animals, will be found out, as may very much fa-

Facilitate, and Advance too, Anatomicall Knowledg. Neither is it only by advancing This, that the Naturaliſt may promote the Phyſiologicall Part of Phyſick: for ſince the Body conſiſts not only of firme and conſiſtent Parts, as the Bones, Muſcles, Heart, Liver, &c. but of fluid ones, as the Blood, Serum, Gall, and other Juices. And ſince conſequently to the compleat Knowledge of the uſe of all the Parts we ſhould inveſtigate, not only the Structure of the Solid ones, but the Nature of the Fluid ones, the Naturaliſt may do much more then hath yet been done, towards the perfecting of this Kowledge, not only by better explicating what it is in generall makes Bodies either Conſiſtent or Fluid, but by examining particularly, and eſpecially in a Pyrotechnicall way, the Nature of the ſeverall Juices of the Body, and by illuſtrating the Alterations that thoſe Juices, and the Aliments they are made of, receive in the Stomach, Heart, Liver, Kidneys, and other *Viſcera*. For although a humane Body being the moſt admirable Corporeall Piece of Workmanſhip of the Omniſcient Architect, it is ſcarce to be hop'd, but that even among the things that happen ordinarily and regularly in it, there will be many which we ſhall ſcarce be able to reach with our Underſtanding, much leſſe to imitate with our Hands. Yet paradventure, if Chymicall Experiments, and Mechanicall Contrivances, were induſtriouſly, and judiciouſly, aſſociated by a Naturaliſt profoundly skill'd in both, and who would make it his Buſineſſe to explain the *Phænomena* of a Humane Body, not only many more of them then at firſt one would think, might be made more intelligible then as yet they have been; but diverſe of them (eſpecially thoſe relating to the motions of the Limbs and Blood) might be by artificiall Engines (conſiſting as the Patterne not only of Solid but Liquid and Spirituous Parts) not ill repreſented to our very Senſes: ſince a humane Body it ſelfe ſeems to be but an En-

gine, wherein almoſt, if not more then almoſt, all the Actions common to Men, with other Animals, are perform'd Mechanically. But of the difference of theſe living Engines from others, I may elſewhere have a fitter opportunity to diſcourſe to You. For at preſent, *Pyro*: I have employ'd ſo much of the little time my Occaſions will allow me to ſpend upon the Treatiſe I am now writing, in making out to you the Uſefulneſſe of Naturall Philoſophy, to the Phyſiologicall Part of Phyſick, that I muſt not only not proſecute this Subject, but muſt both haſten to mention, and to mention the more curſorily its ſerviceableneſſe to the four remaining Parts of the Phyſitians Art.

ESSAY II.

ESSAY II.

Offering some Particulars relating to the Pathologicall Part of Physick.

AND to say something in the next place of *Pathology*, that the Naturalists knowledge may assist the Physitianto discover the nature and causes of severall Diseases, may appear by the light of this Consideration, that, though divers *Paracelsians* (taught, as they tell us, by their Master) do but erroniously suppose, that Man is so properly a Microcosme, that of all the sorts of Creatures whereof the Macrocosme or Universe is made up, he really consists; yet certaine it is that there are many Productions, Operations, and Changes of things, which being as well to be met with in the great, as in the little world, and diverse of them disclosing their natures more discernably in the former, then in the latter; the knowledge of the nature of those things as they are discoverable *out* of mans body, may well be suppos'd capable of illustrating many things *in* man's body, which receiving some Modifications there from the nature of the Subject they belong to, passe under the notion of the Causes or Symptomes of Diseases. If I were now, *Pyrophilus*, to discourse to you at large of this Subject, I think I could convince you of the truth of what I have proposed. And certainly, unlesse a Physitian be, (which yet I fear every one is not) so much a Naturalist, as to know how Heat, and Cold, and Fluidity, and Compactnesse,

and Fermentation, and Putrefaction, and Viſcoſity, and Coagulation, and Diſſolution, and ſuch like Qualities, are generated and deſtroyed in the generality of Bodies, he will be often very much to ſeek, when he is to inveſtigate the cauſes of preternaturall Accidents in men's bodies, whereof a great many depend upon the Preſence, or Change, or Vaniſhing of ſome or other of the enumerated Qualities, in ſome of the Fluid or Solid Subſtances that conſtitute the body. And that the Explications of a skilfull Naturaliſt may adde much to what has hitherto commonly been taught concerning the Nature and Origine of thoſe Qualities, in Phiſitians Schools, a little comparing of the vulgar Doctrine, with thoſe various Phænomena, to be met with among Naturall things, that ought to be, and yet ſeem not to be, explicable by it, will eaſily manifeſt to you. And queſtionleſſe 'tis a great advantage to have been taught by variety of Experiments in other bodies, the Differing waies whereby Nature ſometimes produces the ſame effects. For ſince we know very little *à priori*, the obſervation of many ſuch effects, manifeſting, that nature doth actually produce them ſo and ſo, ſuggeſts to us ſeverall wayes of explicating the ſame Phænomenon, ſome of which we ſhould perhaps never elſe have dream'd of. Which ought to be eſteem'd no ſmall Advantage to the Phyſitian; ſince he that knows but one or few of Natures wayes of working, and conſequently, is likely to ignore divers of thoſe whereby the propoſ'd Diſeaſe (or Symptome of it) may be produc'd, muſt ſometimes conclude, that preciſely *ſuch* or *ſuch* a thing is the determinate Cauſe of it, and apply his Method of relieving his Patient accordingly; which often proves very prejudiciall to the poor Patient, who dearly paies for his Phyſitians not knowing, That the Quality that occaſions the Diſtemper, may be as probably, if not more rationally, deduc'd from an other Origine, then from that which is preſum'd. This will ſcarce

ſcarce be doubted by him that knowes how much more likely Explications then thoſe applauded ſome ages ſince, of divers things that happen as well within as without the body, have been given by later Naturaliſts, both Philoſophers and Phyſitians: and how much the Theory of the Stone, and many other diſeaſes, that has been given us by thoſe many Phyſitians, that would needs deduce all the Phænomena of diſeaſes from Heat, Cold, and other Elementary Qualities, is Inferiour to the Account given us of them by thoſe ingenious Moderns, that have apply'd to the advancement of Pathologie, that Circulation of the Blood, the Motion of the Chile by the Milky veſſels to the Heart, the conſideration of the effects deducible from the Pores of greater bodies, and the motion and figuration of their minute parts, together with ſome of the more known Chymicall Experiments: though both of thoſe, and of the other helps mention'd juſt before them, I fear men have hitherto been far enough from making the beſt uſe, which I hope it will dayly more and more appear they are capable of being put to. He that has not had the curioſity to enquire out and conſider the ſeverall waies, whereby Stones may be generated out of the body, not only muſt be unable ſatisfactorily to explicate how they come to be produc'd in the Kidnies and in the Bladder, but will, perhaps, ſcarce keep himſelfe from imbracing ſuch errors, becauſe authoriz'd by the ſuffrage of eminent Phyſitians, as the knowledge I am recommending would eaſily protect them from. For we find diverſe famous, and, otherwiſe, learned Doctors, who (probably becauſe they had not taken notice of any other way of hardning a matter once ſoft into a ſtonelike conſiſtence) have believ'd and taught that the Stone of the Kidneyes is produc'd there by ſlime baked by the heat and drineſſe of the Part; as a portion of ſoft Clay may, by externall heat, be turn'd into a Brick or Tile. And accordingly they have

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for cure, thought it sufficient to make use of store of Remedies to moisten and cool the Kidneys; which, though in some bodies this be very convenient, are yet far inferiour in efficacy to those Nobler medicines, that by specifick qualities and properties are averse to such coagulations as produce the Stone. But (not to mention what a Physitian skill'd in Anatomy would object against this Theory from the nature of the part affected) 'tis not unlike, the imbraces of this Hypothesis would not have acquiesc'd in it, if they had seen those putrefactions out of the bodies of men, which we elsewhere mention'd. For these would have inform'd them, that a Liquor abounding with petrescent parts, may not only turn Wood (as I have observ'd in a petrifying Spring) into a kind of Stone, and may give to Cheese and Mosse without spoiling their pristine appearance a strong hardnesse and weight; but may also produce large and finely shap'd Christalline bodies (though those I try'd were much lesse hard then Chrystall) in the bosome of the cold water, which brings into my mind, that I have diverse times produc'd a body of an almost stony hardnesse in lesse then halfe an hour, even in the midst of the water, by tying up in a rag, about the quantity of a nutmeg, of well and recently calcin'd Alabastre, which being thus ty'd up and thrown into the botome of a bason full of water, did there speedily harden into a Lapideous Concretion. And that even in the bodies of Animals themselves such concretions may be generated much otherwise then the Hypothesis we have been speaking of supposes, may appear by what happens to Craw-fishes, which though cold animals, and living in the waters, have generated at certain seasons in their heads Concretions, which for their hard and pulverizable consistence, divers Authors call *lapides Cancrorum*, though in the Shops they are often but abusively styled *Oculi cancrorum*. And such strong concretions are affirm'd

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to be generated in these Fishes every Year, which I the less scrupled at, because I have not found them at all times in the Head of the Fish. And besides, these and many more Concretions, that had they been observ'd by the Physitians we have been speaking of, might easily have kept them from acquiescing in, and maintaining their improbable explication of the manner of the Stones nativity: There is yet another kind of Coagulation, which may both be added to the former, and perhaps also serve to recommend the use of Chymical Experiments, in investigating the Causes of Diseases: This is made by the mixture of exquisitely dephlegm'd Spirit of fermented humane Urine, with as exactly rectified Spirit of Wine; for upon the confusion of those two volatile Liquors in a just proportion, they will both of them, as after *Lullius* Experience hath inform'd us, suddenly coagulate into a white Mass, which *Helmont* calls *Offa alba*, and by which, he endeavors to declare the procreation of the Duelech: for supposing himself to have found in humane Urine a potential *Aqua vitæ*, or Vinous Spirit, capable of being excited by a putrid Ferment, and coagulable by the volatile Salt of the same Urine, if there were any volatil Earth lurking in the Liquors, That being apprehended by the uniting Spirits, and coagulated with them both; he supposeth there may emerge from the union of those three Bodies such an anomalous Concretion, as he, after *Paracelsus*, calls *Duelech*. *Helmont de Lith: cap. 3. & 4.*

And that a subtile Terrestrious Substance may lurk undiscerned, even in limpid Liquors, may appear, not onely in Wine, which rejects and fastens to the sides of the conteining Vessel, a Tartar, abounding in Terrestrious Feculency; and in common Urine of healthy Men, which, though clear at its first emission into the Urinal, does, after a little rest there, let fall an *Hypostasis*, or Sediment, which, if distill'd before fermentation, leaves in the bottom of the Cucurbite an Earthy

Subſtance, and commonly ſome Gravel: but even in rectified Spirit of Urine it ſelf, I have had opportunity to obſerve, That after very long keeping, there hath ſpontaneouſly precipitated a Feculency, copious enough in proportion to the Liquor that afforded it. Nay, in an other parcel of Spirit of Urine, that hath been kept much longer then that already mention'd, we obſerv'd the other day, that not onely there was a Terreſtrial reſidence fallen to the bottom of the Glaſs, but to the ſides of it as far as the Liquor reach'd, there adhered a great multitude of ſmall Concretions; which, as far as appeared by looking on them through the Cryſtal Viol, to whoſe inſides they were faſtened, were no other then little grains of Gravel, ſuch as are often found ſticking to the ſides of Urinals, employed by calculous perſons.

To which we might adde an Experiment of ours, whereby we are wont almoſt in a moment, by barely mixing together a couple of Liquors, both of them diſtill'd and tranſparent, and yet not both of them ſalin'd to thick them very notably and permanently, inſomuch that they ſeem not to precipitate each other; yet having once, for curioſity ſake, diſtill'd them with a prety ſtrong Fire, I obtain'd a great quantity (as I remember, a fourth of the whole mixture) of a blackiſh Maſs, that was not onely coagulated and dry, but even brittle: But of the coagulation of diſtill'd Liquors, ſuch as even Chymiſts themſelves are not wont to look upon as at all diſpoſ'd to coagulation, I may elſewhere have a better opportunity to entertain you, and therefore I ſhall forbear to do it now.

And by this way, *Pyrophilus*, doth *Helmont*, if I underſtand him aright, attempt to make out the generation of the Stone in humane Bodys: In which Theory, though ſome difficulties do yet keep me from acquieſcing, yet, beſides that perhaps what you will meet with by and by (about the diſtillation of the *Duelech*) may make you the leſs wonder at this ex-

explication. Besides this, I say, granting that none of the enumerated ways of Petrescency (if I may so speak) deserves to be look'd upon as satisfactory; yet to give so much as an account, *not very absurd*, of a Disease so anomalous and abstruse, and hitherto so unluckily explicated by Physitians, is perhaps more difficult, then it were to give (at least) a *plausible* account of divers other Distempers.

And possibly it may be safely enough affirmed, That not onely Physiology, in its full extent, but that Hand-maid to it, which is call'd Chymistry, may not a little contribute to clear up the nature of both of the digestions, and of those deficiencies or aberrations in them, which produce a great part of Diseases; especially if we allow what, as well Physitians, as Spagyrists agree in (whether warily enough or not, I shall not now dispute) *viz.* That whatever is separable from Bodies by the Fire, was, as a Constituent Element (or Principle) pre-existent in them.

Perhaps I need not minde you, *Pyrophilus*, that 'tis usual with the meerly *Galenical* Doctors themselves, to explicate the nature of Catarrhs, by comparing the Stomach to a seething Pot, and the Head to an Alembick, where the ascending Vapors, being, by the coldness of the Brain, condens'd into a Liquor, sometimes distil upon the Lungs, and sometimes fall upon other weakned parts; in which explication, though for divers reasons I cannot acquiesce, yet it may suffice to shew you how little scruple many Learned Men, not like to be partial in the Case, would make of employing Chymical Operations to illustrate the Doctrine of Diseases. And indeed, since the Liquors contain'd in the Body abound, divers of them, with saline or sulphureous parts, he that hath been by Chymistry taught the nature of the several sorts of Salts and Sulphurs, and both beheld and considered their various actions one upon another, and upon other Bodies, seems to

have a considerable help to discourse groundedly of the Changes and Operations of the humors, and other Juices contein'd in the Body, which he hath not that hath never had *Vulcan* for his Instructer. He that findes that there may be acid Juices in the Stomach, and elsewhere (as is frequently evident in the sharp Liquors which many Stomachs cast up) and that there are also Sulphureous Salts in the Body(as is apparent in Blood and Urine, which abound with such.) He that knows that the *Serum* that swims upon the Blood out of the Body, is by a gentle heat immediatly coagulable into a thick whitish Substance, not unlike a Custard; and that Chymically analiz'd Blood yields store of volatile and sulphureous, but (as far as our tryals have hitherto inform'd us) no acid saltness.

He that knows that these animal Salts and Spirits may be so powerful, that we have been able with Spirit of Urine, or of Harts-horn, to make a red Solution of Flowers of Sulphur, and that with Spirit of Urine (though drawn without violence of Fire) we have (as we elsewhere more particularly declare) dissolved both in a very gentle heat, and in a very short time, the un-open'd Body of crude Copper, so as to make thereof a Solution of a rich, deep, and ev'n opacous Blew: And that we have done almost the like with unrectified Spirit of Mans Blood.

He that hath, as we have done, examin'd by Fire (especially produc'd by the help of a Burning-glass) that limpid Liquor that is to be found in the Limphatick Vessels, and hath taken notice of that odde consistence, smell, crackling, and other qualities discernable in it by heat.

He that observes how acid Liquors loose their acidity, by working upon some Bodies; as when Spirit of Viniger grows almost insipid upon the coral it hath corroded, *and* how those saline Liquors, by working upon certain Bodies, degenerate into Salts of another nature, as we have sometimes observ'd

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in Oyl of Vitriol, working upon the fourth part of its weight of Quick-silver, and how the contrariety of acid and sulphureous Salts makes them sometimes disarm, sometimes, after some ebullition, precipitate each other; and sometimes unite into a third substance, of a differing nature from either of those from whose coalition it results, as we see in *Tartarũ Vitriolatũ*; and, as I have observ'd, in a Salt, I sometimes make to emerge from a due proportion of Oyl of Vitriol and Spirit of Urine, freed, after conjunction, from their aqueous moisture: And He, in a word, that hath carefully analiz'd and made tryals on many parts, both of the Macrocosm and Microcosm, and heedfully applyed his Experiments made on the former, to the illustration of the changes observable in the latter, shall be likely to explicate divers particulars in Pathology, more intelligibly then he that is a stranger to Chymistry.

And though I am very unwilling to meddle with Medical Controversies, and am apt to think, that Chymists are wont to speak somewhat too slightingly of the humors of the humane Body, and allow them too little a share in the production of Diseases; yet (to skip other reasons) the strange stories related by *Skenkius*, and other eminent Physitians, of the corrosiveness of some Juices, which, rejected by Urine or Vomits, have been able to boyl on Brass, fret Linnen, and stain Silver; together with some odde Observations of this nature, our selves have had opportunity to make, do very much incline us to believe, That the generality of former Physitians have ascrib'd too much to the Humors, under the notion of their being hot and dry, cold and moist, or endowed with such other Elementary Qualities, and have taken a great deal too little notice of the saline (if I may so speak) and Sulphureous Properties of things. And in this Opinion I am not a little confirmed by the authority of *Hippocrates* himself, both in other passages, and especially where he says,

Non

Non calidum, frigidum, humidum, aut ſiccum, eſſe quod magnam agendi, vim habet, verum amarum & ſalſum & dulce & acidum & inſipidum & acerbum, &c. are the things which, though inoffenſive to the Body, whilſt they duly allay each other, prove hurtful to it, and diſtemper it, when any of them comes to ſever it ſelf from the reſt, and grow predominant. And indeed, if the Juices of the Body were more Chymically examin'd, eſpecially by a Naturaliſt that knows the ways of making fix'd Bodies volatile, and volatile fix'd, and knows the power of the open Air in promoting the former of thoſe Operations; it is not improbable, that both many things relating to the nature of the Humors, and to the ways of ſweetning, acuating, and otherwiſe altering them may be detected, and the importance of ſuch Diſcoveries may be diſcern'd.

And perhaps it would adde to the uſefulneſſe of ſuch an examination, if it were extended to the noxious Juices in diſtemper'd bodies: ſuch as the rotten Phlegme ſpit up by thoſe, whoſe Lungs are diſaffected; the ſlimy excretions voided in the Lyantery, and the liquor that diſtends the *abdomen* in the Dropſy and *Aſcites*: concerning which (to tell you that upon the by) I found that it was of a differing nature from either Water or Urine. For a *paracentecis* being made in the *abdomen* of one dangerouſly ſick of this ſort of Dropſie, I found that the Liquor would keep a pretty while without putrefaction, (nor did the Patient's body, when I afterwards ſaw it open'd, ſmell almoſt at all, though the inſide of the *abdomen* lookt well neer as black, as if it had been ſphacelated:) and having ſteam'd away ſome of it, whilſt it was pretty freſh, over a ſomewhat ſlow fire; it firſt coagulated into a ſubſtance like Whites of Eggs, and, by a little farther evaporation, turn'd to ſuch a glutinous ſubſtance, as tradeſmen are wont to call *Size*; and being kept longer on the fire grew to be hard like

like fish glew, but more brittle, and transparent enough, but with a little tincture of a greenish yellow; and some of the forementioned liquor being distill'd in a Retort, did towards the end of the operation so darken the vessell with a thick blackish oyle, as hindred me from discerning what else perhaps I might have seen And I suppose it may prove a usefull instance to the former purpose, if I somewhat circumstantially annex here what occurr'd to me, when I was accidentally considering of the *Calculus humanus*.

Having therefore obtein'd of a skilfull Lithotomist of my acquaintance divers Stones, which he had cut out of mens bladders, I chose a couple of them (which were whitish almost, of equall bigness, and figure, which was neer ovall, and which together weighed about two ounces and an halfe, these with the help of a strong knife I carefully open'd, to find whether or no either of them consisted of an entire and uniforme matter, (as most other stones, and even some *calculi humani* do) and I found that each of them was made up of severall shells, as it were, successively involving one another, like the rinds of an Onion, and such shels, but more soft, and more of a colour; we likewise observed in a great stone taken a while since out of an Oxe's Gall, and sent us for a present; and though all of these were of an almost stony hardness, yet that hardness was not equall in them all; and in one of the stones we observed one of the rinds (to make use of that expression) to be of a differing colour both frm that which immediatly imbraced it, and from that which it immediately imbrac'd: some of these rinds equalled in thickness the length of a barley corne, and others were somewhat thinner. Though they did closely imbrace one another, yet they were actually separable, as well as visibly distinguishable. And proceeding very warily in the breaking one of these stones, we found that in the center of it, there lay a small and soft ovall

stone

ſtone, as it were the kernell of thoſe conglomerated ſhells; and this kernell lay ſo looſe, that with a little induſtry and patience we picked it out of the ſhell, and kept it by us as a rarity. This done, being deſirous to know whither Chymicall tortures would force theſe Concreats to a further confeſſion of their nature, we cauſed them to be finely powdred, and put into a ſmall but ſtrongly coated glaſſe Retort, whereunto luting a much larger Retort for a Receiver; we found that theſe two ounces and halfe of powder, being diſtilled for ſome hours in a naked fire, afforded us great ſtore of volatile Salt (partly grey and partly white) which almoſt coverd the inſide of the Receiver, and a pretty quantity of reddiſh ſpirit, which in the Receiver it ſelfe ſoon coagulated into Salt, and having ſevered our veſſels, we found in the neck of the Receiver a very little darkiſh oyle, but in the neck of the Retort a greater quantity of the ſame aduſt Oyl, incorporated with a pretty quantity of volatile Salt, whoſe ſmell did readily recall to my minde that peculiar kinde of ſtink which I had ſometimes taken notice of in the volatile Salt of unfermented Urine; nor were the taſte of theſe two Salts unlike. The *caput mortuum* conſiſted of a fine, light, cole-black Powder, not unlike the fineſt ſort of Soot; and by weighing but of ſix Drachmes, it inform'd us, that above two thirds of the diſtill'd *calculi humani* had been, as being volatile, forced from the Terreſtrial Parts, even in a cloſe Veſſel, wherein the *caput mortuum*, though it were left inſipid enough, yet retained ſtink enough to make us think, it ſtill conteined pretty ſtore of heavy Oyl: as indeed, having put it into a Crucible, and kept it a competent while in a ſtronger fire, we found it reduced to about two Drachmes of a brittle Maſs of inſipid white Calx, which did not ſlack, or fall aſunder like Lime when it is caſt into Water.

To

To this Example of the usefulnesse of Chymistry, to discover the unobserv'd, and otherwise scarce discoverable difference of the *calculus humanus* from other stones; we may venture to adde, That though some *Paracelsians* do take too much liberty, when they crudely tell us, that there are arsenicall, vitriolate, aluminous, and other minerall substances, generated in humane bodies, yet if they had more warily propos'd their Doctrine, it would not perhaps appear so absurd, as they are wont to think it, who considering only the nature of the Aliments men usually feed upon, cannot conceive that such being but either Animals or Vegetables, can by so gentle a heat as that of man's body, (by which they suppose all the changes of the Aliments must be effected,) be Exalted to an energie like that of such bodies as are compos'd of active Minerall substances, and have some of them perchance acquir'd a violence of operation from the fire. But we see that Concretions, so like Stones, (which belong to the Minerall Kingdome,) as to passe generally for such, may be produc'd in the bodies not only of men but of sucking children, whose Aliment is fluid Milk: and it seems a mistake to imagine (how many soever do so) that Heat must needs be the Efficient of all the changes the matter of our Aliments may happen to undergoe in a humane body: where there are Streiners, and Solvents, and new Mixtions, and perhaps Ferments, and diverse other powerfull Agents, which by successively working upon the assum'd matter, may so fashion and qualifie it, as, in some cases, to bring the more dispos'd part of it to be not unlike even fossile Salts, or other minerall substances. A very eminent person was lately complaining to me, that in the fits of a distemper, which almost as much puzzls her Physitians as her selfe, she sometimes vomits up something so sharp and fretting, that, after it hath burnt her throat in its passage, almost like scalding water, it doth not only Staine the Silver vessels that receiv'd

it, but also work upon them, as if it were a Corrosive Menstruum. And there dyed a while since a very intelligent person, much imploy'd in publick affaires, who complain'd to me, that in the fits of the strange distemper he labor'd under, he divers times observ'd, that, that part of his pillow which his breath passed along, would by the strange fuliginous Steams, which that carried off with it, be blackt over, as if it had been held in some sooty smoak or other.

We may also consider, that the Rain-water, which in its passage through a Vine, or an Apricok-tree, or the like plants, is turn'd into a sweet fruit; in its passage through those plants that bear Lemmons and Barberries, is transmuted into a liquor sharp enough to corrode, not only Pearles but Corall, *lapides cancrorum*, and other hard Concrets, as spirit of Vitrioll would do. And writers of unsuspected credit, affirme, that an *Indian* fruit, (whose name I cannnot readily call to mind) will speedily corrode and wast the very steel knives 'tis cut with, if its Juice be left long upon them: and we see that some sorts even of our Apples and Peares, will quickly black the blades of Knives on which the Juice is suffer'd to continue. And least what I freshly mention'd about Limmon trees, should be question'd, I will here adde, that I remember also that I have made not only some other hot and strongly tasted Herbs, but even a *Ranunculus* it selfe, to grow and increase notably in weight as well as bulk, though I fed it but with fair water: and allowd it nothing else to shoot its roots into. Wherefore since this plant is reckon'd amongst those, that either are poisonous, or want but little of being so; and since its operation is so violent, that this sort of Vegetables, is taken notice of from the experience of Country people, to be able by outward application to draw blisters, and since nevertheless that which this plant, without any heat discernable by the touch, transmutes into so virulent a substance, is but so una-

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ctive a body as water; why may not such aliments, as may have in them divers parts of a far more operative nature, be in a humane body, by an unusuall concourse of Causes and Circumstances, so alter'd and exalted, as to approach in operations (especially upon the more tender parts) to those of fossile Salts or other Minerals? So that a Chymist might upon such an account, without any great absurdity, teach some parcels of morbifick matter to be of an Arsenicall, or a Vitriolate, or an Antimoniall nature, especially since we see that sometimes Cancers, Ulcers, and sharp Juices generated in the body, doe by their vitiating and *wasting* the invaded parts, but too much emulate the pernitious operations of Arsnick, and of fretting Salts: and the infusion of Antimonie doth scarce more stimulate nature to disburthen her selfe both upwards aud downwards, then doth sometimes an humor, such as that which causes the *Cholera morbus*, and perhaps more violent diseases.

And that such degenerations of Innocent aliments should sometimes happen in discompos'd bodies, you will perhaps think the lesse strange, if you duly perpend what I lately mention'd, of the transmutation of Water into hot and vesicatory substances; and if thereto I annex, that from a single pound of so common and temperate an Aliment as Bread, I can by an easie way, (and that without addition,) obteine many ounces of a *menstruum*, which (as tryall has inform'd) will worke more powerfully upon bodies, more compact then some hard mineralls, or perhaps Glasse it selfe: then a wary Chymist would expect to see *Aqua fortis* doe. These things I have mention'd, *Pyrophilus*, to intimate some of the Reasons, why I think Chymicall Experiments may be usefully apply'd, to illustrate some things in Pathologie, either by imitating out of the body, the production of some sorts of morbifick matter, or by such resolutions of that which is generated in the body, as may conduce to the discovery of its nature. And not that

I think, as Spagyrists do, the experiments or notions of vulgar Chymists sufficient to explicate the whole doctrine either of Digestion or of Diseases: for it would be very difficult for them to make out the manner of Nutrition, or so much as how they that feed only on Vegetables, should (to propose the difficulty in their own Terms) have their Blood and Urine copiously enrich'd with a volatile sulphureous Salt, of which sort, plants are not wont to yeild any in distillation. And much more difficult would it be for them by principles peculiar to Chymists to make out the propagation of Hereditary diseases: or how madnesse,& some other distempers,that do not visibly vitiate the organes of those functions that they pervert, should not only prove hereditary, but lurk very many yeares in the inheriting person's body, before they begin to disclose themselves: and sometimes too, be transmitted from the Grandfather to the Grand-child, and skip immediately the intervening Son. And therefore I say again, that I pretend not that Vulgar Chymistry will enable a Physitian to explicate all or most of the Pathologicall *Phænomena*; but that True Chymistry may assist him to explicate diverse of them, which can scarce be solidly explicated without it. And let me adde, that he that throughly understands the nature of Ferments and Fermentations, shall probably be much better able then he that ignores them, to give a fair account of divers *phænomena* of severall diseases (as well Feavers as others) which will perhaps be never throughly understood, without an insight into the doctrine of Fermentation; in order to which, for that and other reasons, I design'd my Historicall notes touching that subject.

Yet I am not sure, but there may be effervescences, (and perhaps periodicall ones) in the Blood and other Juices of the body without Fermentation properly so call'd. For there may be divers other waies of begetting a præternaturall heat

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in the Blood. We often ſee that in Coughs, when the flegme is rottten (as they ſpeak) that is, when its former viſcous texture is alter'd, it does no longer ſtick faſt to the veſſels of the Lungs, to which it obſtinately adher'd before. And ſo at certain times other humors in the body, either by growing more fluid themſelves, or by ſome change in the Blood, whereby it becomes fitter to diſſolve ſuch humors, may ſwimme in, and be circulated with, the maſſe of blood, and thereby occaſion præternaturall heats: *either* by their indiſpoſition to be well, and incorporated therewith: *or* by altering its texture: *or* diſturbing the wonted motion of its minute parts: *or* by oppoſing its due Rarefaction as it paſſeth through the Heart: *or* by obſtructing the more ſlender Veſſels, and ſo hindering the free Circulation of the Blood through them; perhaps alio cauſing ſome Extravaſation, as we ſee that wounds &bru ſes are attendedwith ſome inflammation,more or leſſe,of the part affected;) or by ſome other of the waies not now to be declared. And tryall hath taught me, that there are Liquors, in which the bare admixture of Milk,Oyle, or other Liquors, nay or of cold water, will preſently occaſion a notable heat: and I ſometimes imploy a *menſtruum*, in which nothing but a little fleſh being put, though no viſible Ebullition enſue, there will in a few minuts, be excited a Heat, intenſe enough to be troubleſome to him that holds the Glaſſe. And yet it ſeems not neceſſary that this ſhould be aſcrib'd to a true fermentation, which may rather proceed from the perturb'd motion of the Corpuſcles of the menſtruum, which being by the adventitious liquor or other body put out of their wonted motion, and into an inordinate one, there is produc'd in the menſtruum a brisk confuſ'd Agitation of the ſmall parts that compoſe it; and in ſuch an agitation, (from what cauſe ſoever it proceeds,) the nature of Heat ſeems mainly to conſiſt. But to diſpatch, I ſcarce doubt, but that if in the hiſtory of diſeaſes, there were better

notice taken of those *Phænomena*, that agree not with the opinions already in requeſt, as well as of thoſe that are thought conſonant to them; and if alſo Chymicall tryals were skilfully varied and judiciouſly applyed to the illuſtrating of Pathologicall *Phænomena*, the former might be made conducing to the better explication of the latter: eſpecially if the buſineſſe were mannag'd by a Naturaliſt well verſ'd both in Chymicall Experiments, and in Anatomy, and the hiſtory of Diſeaſes, without being too much addicted either to the Chymiſt's notions, or the receiv'd opinions of Phyſitians.

And as the Naturaliſt may thus illuſtrate Pathologie as a Chymiſt, ſo may he do the like as a Zoologer; for either the true knowledge of Anatomy muſt be much leſſe uſefull to Phyſitians then they have hitherto beleived, or elſe the diſcoveries made by recent Anatomiſts of the *Aſellian*, *Pecquetian*, and *Bartholinian* veſſels, by either overthrowing the receiv'd doctrine of Digeſtions, (from whoſe aberrations many diſeaſes ſpring) or at leaſt by making diverſe diſcoveries in relation to the æconomy of Digeſtions unknown to the Ancients, moſt probably contribute much to the clearing up of diverſe Pathologicall difficulties in the explication of ſome diſeaſes; beſides, that the very liberty of making thoſe Experiments in live Beaſts, which are not to be made but in living creatures, nor are allowable to be made in living men, may enable a Zologiſt, by giving us a clearer account of divers parts of the body, to determine divers Pathologicall difficulties ſpringing from either our ignorance or miſtakes of the uſe of thoſe parts, as by the formerly mention'd Experiment of the exſection of a live dogge's Spleen, and a watchfull obſervation of all the diſeaſes upon that Account, befalling him and other Dogs ſo ſerv'd; much light perhaps may be given to the doctrin of the uſe of the Spleen, together with the diſeaſes ſuppoſed to depend on that part, which I fear is hitherto (to the no

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ſmall prejudice of the Sick) by few Phyſitians throughly underſtood, and by many unhappily enough miſtaken.

And here we may repreſent unto you, *Pyr:* that not only the diſſections of ſound Beaſts may aſſiſt the Phyſitian to diſcover the like parts of a humane body, but the diſſections of morbid beaſts may ſometimes illuſtrate the doctrine of the cauſes and ſeats of diſeaſes. For that this part of Pathology has been very much improved by the diligence of modern Phyſitians, by diſſecting the bodies of men kill'd by Diſeaſes, we might be juſtly accuſed of want of curioſity, or gratitude, if we did not thankfully acknowledge; For indeed much of that improvement of Phyſick, (for which the Ancients, if they were now alive, might envy our new Phyſitians) may, in my poor opinion, be aſcribed to their induſtrious ſcrutiny of the Seat and Effects of the peccant matter of Diſeaſes in the bodies of thoſe that have been deſtroyed by them.

And that the inſtructions deducible from ſuch obſervations may be either increaſed or illuſtrated by the like obſervations made in the bodies of Beaſts, we have been inclin'd to think, partly by the having Chymically analyz'd (as they phraſe it) the blood of divers Bruits, as Sheep, Deer, &c. and found its Phlegme, Spirit, Salt, aud Oyle, very like that of humane bloud; and partly by our having obſerv'd in the bodies of ſeverall Bruits, (not excepting Fiſhes) Wormes, Impoſthumes, and the like, ſome of which ſeem'd manifeſtly to ſpring from ſuch cauſes, as are wont to produce reſembling diſtempers in men: and if the acute *Helmont* had been a more diligent diſſector of Beaſts, he would perchance have eſcaped the Error he after others run into (and into which his Authority hath tempted others to run) when he affirm'd, that the Stone was a diſeaſe peculiar to men, for, that in the bodies of Beaſts, eſpecially very Old ones, Stones are ſometimes to be found, not only ſeverall Butchers have aſſur'd me, but you may gather

partly

partly from that taken out of an Oxe's Gall, which I have formerly mention'd, which was about the bigneſſe of a Wall-nut) but principally from what I elſewhere deliver'd on purpoſe to diſprove that fond aſſertion: and greater leaſure may, upon another occaſion, invite us to mention ſome pathologicall Obſervations made in diſeaſed Beaſts, by which, (were we not willing to haſten,) we might now perhaps much confirme what we have propoſ'd touching the poſſibility of illuſtrating, by ſuch Obſervations, the nature of ſome of the Diſeaſes incident to humane bodies.

And here we may alſo conſider that there are diverſe Explications of particular Diſeaſes, or troubleſome Accidents propoſ'd by Phyſitians, eſpecially ſince the Diſcovery of the Bloods Circulation, wherein the Compreſſion, Obſtruction, or Irritation of ſome Nerve, or the Diſtenſion of ſome Veine by too much Bloud, or ſome Hinderance of the free Paſſage of the Bloud through this or that particular Veſſell, is aſſign'd for the cauſe of this or that Diſeaſe or Symptome. Now in diverſe of theſe caſes the Liberty lately mention'd, that a skilfull Diſſector may take in Beaſts, to open the Body or Limbs, to make Ligatures ſtrong or weak on the veſſells, or other inward parts, as occaſion ſhall require, to leave them there as long as he pleaſeth, to prick, or apply ſharp liquors to any nervous or membranous part, and whenever he thinkes convenient, to diſſect the Animall again, to obſerve what change his Experiment hath produc'd there: ſuch a Liberty, I ſay, which is not to be taken in humane bodies, may in ſome caſes either confirme or confute the Theories propoſd, and ſo put an end to diverſe Pathologicall Controverſies, and perhaps too occaſion the Diſcovery of the true and genuine cauſes of the *Phænomena* diſputed of, or of others really as abſtruſe.

To this let me adde, that there is a whole *claſsis* of diſeaſes to

to be met with in Phyſitians Books, which proceed not originally from any internal diſtemper of the Patient, but are produced by ſome exterior Poyſon, and are therefore wont to be call'd by Doctors, *Morbi à veneno orti*, to the more acurate knowledge of divers of which Diſeaſes, Experiments made on Bruits may not a little conduce: For though I deny not that ſome things may be Poyſons to Man, that are not ſo to ſome Beaſts; and on the contrary (as we have more then once given to a Dog, without much harming him, ſuch a quantity of *Opium*, as would probably have ſuffic'd to have kill'd ſeveral Men) yet the greater number of Poyſons being ſuch both to Man and Bruits, the liberty of exhibiting them, when, and in what manner we pleaſe, to theſe (which we dare not do to him) allows us great opportunities of obſerving their manner of operation and inveſtigating their Nature, as our ſelves have tryed, and that ſometimes with unexpected events (as when lately a Cat ran mad, ſo that her Keeper was fain to kill her) upon a large doſe of *Opium* which we cauſ'd to be given her.

And on this occaſion I ſhall not ſcruple to tranſcribe an Obſervation out of a Diſcourſe, I ſome years ſince writ to a Friend, about the turning Poyſons into Medicines, becauſe that Treatiſe, I am like, for certain reaſons, to ſuppreſs: The words, as I there finde them, are theſe,

Before I take leave of Vipers (or Adders, as ſome will have, thoſe that here in England *commonly paſs for Vipers) it will not be impertinent to tell you, That it may be juſtly doubted, whether they be to be reckon'd amongſt poyſonous Creatures, in ſuch a ſenſe as thoſe other venomous Creatures, who have in them a conſtant, and, if I may ſo ſpeak, groſs and tangible Poyſon; for it may be ſuppoſ'd, that the venom of Vipers conſiſts chiefly in the rage and fury wherewith they bite, and not in any part of the Body, which hath at all times a mortal property: Thus the*

madneſs of a Dog makes his teeth Poyſonous, which before were not ſo: And Authors of good repute ſupply us with inſtances of hurts in themſelves, free from danger, that have been made fatal by a Venom created by the fierceneſs of the inraged (though not otherwiſe poyſonous) Creatures that inflicted them. And Baccius, *if I miſtake not, in his Treatiſe* De Venenis, *tells us a memorable Story (whereof he affirms himſelf to have been an eye-witneſs) of a Man who was kill'd within three days, by a ſlight hurt received in his left hand, from an inraged Dung-hill Cock: And that no parts of the Viper have any conſtant inherent Poyſon in them, I have been induced to ſuſpect upon this Experiment; That diſſecting ſome live Vipers, there came in accidentally a ſtrange Dog, to whom I gave the Head, Tail, and Gall (which are the parts ſuppoſed to contain the Poyſon) of one of them, and the Head and Gall of another, wrapt up in meat; after which, I locked the little Dog up in my own Chamber, and watched him, but foũd not that he was ſick, or offerd to vomit at all, but onely lap'd up greedily ſome drink which he eſpyd in the Room; nor was he alone very jocund, for divers hours that I kept him in, but liked his entertainment ſo well, that he would afterwards, when he met me in the Street, leave thoſe that kept him to fawn on and follow me. And having ſince related this Experiment to an inquiſitive Friend of mine, he aſſured me, That to ſatisfie himſelf further in this particular, he gave to a Dog a dozen Heads and Galls of Vipers, without finding them to produce in him any miſchievous ſymptome: To which I ſhall adde, That the old Man, you know, that makes Viper Wine, does it (as himſelf tells me) by leaving the whole Vipers, if they be not very great, perhaps for ſome moneths, without taking out the Galls, or ſeparating any other part from them in the Wine, till it hath diſſolved as much of them as it can.*

And though it may ſeem ſomewhat improper, whil'ſt we are diſcourſing of Poyſons, to inſiſt on a remedy againſt them; yet the

the mention of Vipers recalling into my minde a memorable Experiment which I tryed againſt the biting of Vipers, I ſhall chooſe rather to decline the dictates of Method, then thoſe of Charity, which forbids me to ſuppreſs a remedy that may poſsibly reſcue from ſudden death, a Perſon or other fit to live, or unprepar'd to dye; becauſe it does not ſtrictly belong to the Theme whereto it is referred. The remedy then is this, That as ſoon as ever a Man is bitten (for if the Poyſon have had time enough to diffuſe it ſelf, and gain the Maſs of Blood, I doubt the Experiment will ſcarce ſucceed) a hot Iron be held as near the place as the Patient can poſsibly indure, till it have, as they ſpeak, drawn out all the Venom: which Eye-witneſſes aſſure me (for I have not yet ſeen that my ſelf) will ſometimes adhere like a yellowiſh ſpot to the ſurface of the Iron. But being upon competent grounds ſatisfied of the Experiment, to convince a Phyſitian that miſtruſted it, I laſt Summer hired a Man (who doubted it as little as I) to ſuffer himſelf to be bitten by a Viper; and having in the Phyſitians houſe and preſence, picked out of a good number of them one of the blackeſt I could finde (thoſe of that colour being ſuppoſed the moſt miſchievous) and commanded the fellow to provoke and anger it (which to my wonder he did, a pretty while before the Beaſt would faſten on him) At length, being by his very rude handling thorowly exaſperated, it bit him with great fury, as it ſeem'd, for immediately his hand began to ſwell, and the injured part was grown tumid before we could take from the Fire, which was hard by, a knife that lay heating there; and having apply'd it as near as he could ſuffer it, for about ten or twelve minutes, we found that the ſwelling, though it decreaſed not, did not ſpread; and the Man glad of his money, without further Ceremony, went about his affairs, and told me ſince, That though the tumor continued a while, he had no other inconvenience attending it, and hath divers times got money by repeating the Experiment; though

otherwise, by the casual bitings of Vipers, he hath been much distrest, and his Wife almost kill d.

But, *Pyrophilus*, to return to the Experiments of Poysons made on Beasts, we could wish Physitians were more diligent to make tryals of them, not onely by giving Beasts poysons at the mouth, but also by making external applications of them, especially in those parts where the Vessels that convey Blood more approach the surface of the Body, and also by dexterously wounding determinate Veins with Instruments dipt in Poysons (especially moist or liquid ones) that being carried by the circulated Blood to the Heart and Head, it may be found whether their strength be that way more unimfringed, and their operation more speedy (or otherwise differing) then if they were taken in at the mouth. For I remember sober Travellers have shew'd me some *Indian* Poysons, whose noxious efficacy they affirm'd to be by great intervals of time, differingly mortal, according as the slight hurt made by the points of Arrows, infected with them, did open a capillary, or larger Vein, and were inflicted on a part more or less distant from the Heart; but having not yet made any tryal of this my self, I dare not build upon it. Yet I finde that the formerly commended *Olearius*, in his Travels into *Muscovie* and *Persia*, takes notice of a venomous Insect in *Persia*, which the Natives call *Encureck*, and which he (how justly I know not) makes to be a kinde of *Tarantula*, because it is, as that Creature, in shape almost like a Spider, and speckled, though of twice the bigness of a Thumb: This Insect (says he) instead of stinging or biting, lets his Venom fall in form of a drop of Water, which immediately produces insufferable pains in the part to which it fastens, and suddenly penetrating, as far as to the Stomach, sends up vapors to the Head, which sends again (to use his expression) so profound a sleep to all the Patients limbs,

Voyage de Moscovie & de Perse, pag. 334

limbs, that it is impossible to awaken him, but by one onely Remedy, which is to crush one of these Creatures upon the hurt, whence he abstracts all the Poison. Some horrid and unusual symptomes of this Venom, which yet agree not so well with those that are wont to be produc'd in persons bitten by *Tarantula's*, our Author proceeds to mention; and furnishes us with a proof of what we were lately saying, when we told you that some things were poysonous to Men, which were not to some Beasts: by adding, as an admirable singularity, that the Sheep of those parts do not onely eat these fatal Insects, but seek for them. I know also, by sad experience in my self, what an outward application even of *Cantharides* can do; for having occasion to have a large blister drawn on my Neck, the Chirurgion I employed, unknown to me, made use of *Cantharides*, among other Ingredients of his vesicating Plaister, which a few hours after I had taken it, waken'd me with excessive torment, to which it put me about the neck of my Bladder, so that I apprehended it might proceed from some Stone unable to get out; of which sudden and sensible pain, after I had a while in vain conjectur'd what might be the cause, I at length suspected that which was indeed the true one; and having sent for the Chirurgion, he confess'd to me, upon my demand, that he had put some *Cantharides* in his Plaister, not thinking it would have had such an operation: whereupon I soon reliev'd my self, by drinking new Milk very well sweetned with Suger candy.

Postscript.

Postscript.

TO enable you, *Pyrophilus*, to gratifie those inquisitive Persons that have heard some, and yet but an imperfect Report, of a much noisd Experiment, that was some Years agoe devisd at *Oxford*, and since try'd in other places before very Illustrious Spectators; I am content to take the occasion afforded me, by what was in the foregoing Essay lately mention'd concerning the Application of Poysons, to inform you, That a pretty while after the writing of that Essay, I happen'd to have some Discourse about matters of the like Nature, with those excellent Mathematicians, Dr. *I. Wilkins*, and Mr. *Christopher Wren*; at which the latter of those *Virtuosi* told us, That he thought he could easily contrive a way to convey any liquid Poison immediately into the Mass of Blood. Whereupon, our knowledge of his extraordinary Sagacity, making us very desirous to try what he propos'd, I provided a large Dog, on which he made his Experiment in the presence, and with the assistance of some eminent Physitians, and other learned Men: His way (which is much better learn'd by sight, then relation) was briefly this: First, to make a small and opportune Incision over that part of the hind-leg, where the larger Vessels that carry the Blood, are most easie to be taken hold of: Then to make a Ligature upon those Vessels, and to apply a certain small Plate of Brass (of above half an Inch long, and about a quarter of an Inch broad, whose sides were bending inwards) almost of the shape and bigness of the Nail of a Mans Thumb, but somewhat longer. This Plate had four little holes in the sides, near the corners, that by threads pass'd thorow them, it might be well fasten'd

faſten'd to the Veſſel: And in the ſame little Plate there was alſo left an Aperture, or ſomewhat large Slit, parallel to the ſides of it, and almoſt as long as the Plate, that the Vein might be there expoſ'd to the Lancet, and kept from ſtarting aſide. This Plate being well faſten'd on, he made a Slit along the Vein, from the Ligature towards the Heart, great enough to put in at it the ſlender Pipe of a Syringe: By which I had propoſ'd to have injected a warm ſolution of *Opium* in Sack, that the effect of our Experiment might be the more quick and manifeſt. And accordingly our dexterous Experimenter having ſurmounted the difficulties which the tortur'd Dogs violent ſtruglings interpoſ'd, convey'd a ſmall Doſe of the Solution or Tincture into the open'd Veſſel, whereby, getting into the maſs of Blood (ſome quantity of which, 'tis hard to avoid ſhedding in the operation) it was quickly, by the circular motion of That, carry'd to the Brain, and other patts of the Body. So that we had ſcarce unty'd the Dog (whoſe four feet it had been requiſite to faſten very ſtrongly to the four Corners of the Table) before the *Opium* began to diſcloſe its Narcotick Quality, and almoſt aſſoon as he was upon his feet, he began to nod with his head, and faulter and reel in his pace, and preſently after appear'd ſo ſtupifi'd, that there were Wagers offer'd his Life could not be ſav'd. But I, that was willing to reſerve him for further obſervation, cauſ'd him to be whipp'd up and down the Neighboring Garden, whereby being kept awake, and in motion, after ſome time he began to come to himſelf again; and being led home, and carefully tended, he not onely recover'd, but began to grow fat ſo manifeſtly that 'twas admir'd: But I could not long obſerve how it far'd with him. For this Experiment, and ſome other tryals I made upon him, having made him famous, he was ſoon after ſtoln away from me. Succeeding attempts inform'd us, that the Plate was not neceſſary, if the Finger were

skil-

skilfully employ'd to support the Vessel to be opened; and that a slender Quill, fasten'd to a Bladder, containing the matter to be injected, was somewhat more convenient then a Syringe; as also that this notwithstanding, unless the Dog were pretty big, and lean, that the Vessels might be large enough and easily accessible, the Experiment would not well succeed: The Inventor of it afterwards practic'd it in the presence of that most Learned Noble-man, the Marques of *Dorchester*, and found that a moderate Dose of the infusion of *Crocus Metallorum* did not much move the Dog, to whom it was given: but once that he injected a large Dose (about two Ounces or more) it wrought so soon, and so violently upon a fresh one, that within a few hours after he vomited up Life and all, upon the Straw whereon they had laid him. I afterwards wish'd, that not onely some vehemently working Drugs, but their appropriated Antidotes (or else powerful liquid Cordials) and also some altering Medicines, might be in a plentiful Dose injected. And in Diureticks, a very ingenious Anatomist and Physitian told me, he try'd it with very good success. I likewise propos'd, That if it could be done, without either too much danger or cruelty, tryal might be made upon some humane Bodies, especially those of Malefactors. And some Moneths after a foreign Ambassador, a curious Person, at that time residing in *London*, did me the Honor to visit me, and inform'd me, That he had caus'd tryal to be made, with infusion of *Crocus Metallorum*, upon an inferior Domestick of his that deserv'd to have been hangd; but that the fellow, as soon as ever the Injection begun to be made, did (either really or craftily) fall into a Swoon; whereby, being unwilling to prosecute so hazardous an Experiment, they desisted, without seeing any other Effect of it, save that it was told the Ambassador, that it wrought once downward with him, which yet might, perhaps, be occasion'd for fear or anguish: But the tryals

tryals of a very dexterous Physitian of my acquaintance in humane Bodies, will, perhaps, when I shall have received a more circumstantial account of them, be not unwelcome to you. And in Dogs, you may possibly from our own Observations, receive a further Account of an Experiment, of which, I now chiefly design'd but to relate to you the Rise and first Attempts.

ESSAY III.

Containing some Particulars relating to the Semiotical Part of Physick.

THe *Semiotical* part of the Physitians Art, seems capable of the least improvement by Natural Philosophy. In which yet, *first* the Naturalist may, by illustrating the Anatomical and Pathological parts, assist the Physitian to make more certain conjectures from the signs he discovers of the constitution and distempers of his Patient. For you will easily believe that *cæteris paribus*, he that better knows the nature of the parts and juices of the Body, will be better able to conjecture at the events of Diseases, then he that is less skill'd in them. And *secondly*, The Naturalist by improving the *Therapeutical*, may, at least, much change and alter the Prognosticks of the duration, ferocity and event of Diseases. For, *Pyrophilus*, it would be considered, that the Predictions hitherto current in Authors, and commonly made by Physitians, suppose the use of the received Remedies, and the dogmatical method of Physick; but if there were discovered such generous and commanding Medicines, as, by powerfully assisting Nature, or nimbly proscribing the Morbifick Matter that doth either produce or (though produc'd by them) cherish Sicknesses, might enable Nature to hinder the Disease from continuing its course, and acting almost all the Scenes

Scenes of its Tragedy in the Body; Physitians need not, in acute Diseases, wait so often for a *crisis* to instruct their Prognosticks, and the threatning Symptomes of Chronical Distempers would often prove false Prophets.

To illustrate this but with a not ignoble instance, give me leave to tell you, That when that *Peruvian* Bark, that now begins to be somewhat taken notice of, under the name of *The Jesuits Powder*, had scarce been so much as heard of in this part of *Europe*, I went to visit a *Virtuoso*, who had been for some Moneths afflicted with a Quartan Ague, so violent and stubborn, that it had frustrated the skill, and almost tyred the indeavors of the most eminent Doctors of this Nation; of one of which, who was then accidentally with his Learned Patient, I enquired how my Friend did, and was answered, That he hoped he would recover when the Season would give him leave; but in the Winter he knew no Quartanes cured. Yet the Gentleman acquainting me with his having procured some of the *American* Bark against Agues, which we mentioned in a former Essay, and I (after having tasted and considered it) having incouraged him, as I have others, to make Tryal of it; as the strange Effects I have observ'd of it, hath divers times invited me to do: The candid and learned Doctor, not onely oppos'd not my Perswasions, but added his own to them. And my Friend taking two Doses of this Powder'd Bark, though it were at the unhopefullest Season of the Year (the Winter Solstice)and though he scarce found any sensible operation (unless a little by sweat) of the *Peruvian* Medicine, had by the first Dose his Fit very much lessen'd, and by the second quite remov'd. And though through some irregularities of Dyet (to which that keen Appetite, like that of recovering Persons, which I have observ'd this Powder to be wont to produce, tempted him) he did, as I then foretold him he would, after missing eight or ten Fits, relapse; yet by the

repeated use of the same Remedy, he again recover'd, and hath continu'd so ever since. Having also lately perswaded the use of the same Medicine, in the same Disease, to one of the greatest Ladies in this Nation, she told me the other day, That it immediately, and in unlikely weather, freed her from those Fits, from whence she despair'd to be deliver'd till the Spring. Having likewise sent some of it to a couple of Gentlemen, sick of the like Malady, I had word brought me; That the one had miss'd his Fits for a Moneth, though in the midst of Winter; and the other was by the first Dose cur'd, and continues so. And divers eminent Physitians, to whom I have commended this Specifick, have us'd it with such success, that one of the severest of them, though he had formerly despis'd it, confess'd to me, that in a short time he try'd it upon eight or nine several Persons, without finding it to fail in any, though one of them especially, were, before he was call'd, judg'd irrecoverable; the obstinate Quartan being complicated with other almost as dangerous Distempers. And I confess, I somewhat wonder that Men have not the Curiosity to try the efficacy of this powerful Bark, in other Diseases then Agues: It being highly probable, That a Medicine, capable to prevail so strongly against so obstinate a Disease, as a Quartan (wherein most commonly divers of the considerable parts of the Body are much affected) cannot be useless to several other Distempers. I deny not that those that have taken this Powder, have divers of them, after having miss'd six or seven Fits, relapsed into them (as it likewise happen'd to one of the Gentlemen I sent it to) yet (as I have elsewhere told you) it is much, and more then any common Remedy does to stop the Fits so long. Nor is it a small matter to be able to give the Patient so much breathing time, and allow the Physitian the opportunity of imploying other Remedies. And the Relapses we speak of are commonly cur'd

by

by the ſame Powder: And we have known them prevented, when the Medicine hath been adminiſtred, not by unskilful Perſons, but by a prudent Phyſitian who knows how to aſſiſt it, by opening and gently purging Phyſick. Wherefore that which I ſhould the moſt gladly be ſatisfied of, about this Remedy, is, whether or no it do indeed either proſcribe the Morbifick Matter, or ſo alter its Texture as to make it harmleſs; or elſe, whether it doth ſecretly leave ſuch noxious Impreſſions upon the Spleen, Guts, or ſome other important Part, as may ſhorten Life, by producing in proceſs of time, either the Scurvy, or the Dropſie, or ſome other formidable Diſeaſe. But becauſe the Reſolution of this Doubt muſt be a work of time, we muſt at preſent refer it to future Obſervations, And therefore ſhall now ſubjoyn, that if the famous *Riverius* have not, in his learned Obſervations, flatter'd his own *Febrifugum*, whatever be reſolv'd touching this *Indian* Bark, there will not want a ſafe Remedy which may allow Phyſitians to make more cheerful Predictions about the laſtingneſs and event of Quartains, then have hitherto been uſual.

Riverius in Obſervat:

How painful and ſtubborn a Diſeaſe, the Kings Evil is wont to prove, is ſcarce more known, then that 'tis ſeldom cur'd without a tedious courſe of Phyſick: And yet, by the Herb mention'd in one of the former Eſſays, the yong Gentleman there ſpoken of, was cur'd in a ſhort time, and with little or no pain or trouble. And that theſe are not the onely Diſeaſes in which Obſervations, tending to our preſent purpoſe, may be made, the following part of this Treatiſe will afford you opportunity to obſerve.

I might adde, *Pyrophilus*, that I was lately viſited by an ancient Chymiſt, ennobled by divers eminent cures, who promiſes to me an Experiment of making very unuſual, and yet rational Predictions in ſome abſtruſe Diſeaſes, by a peculiar way of examining the Patients Urine. But becauſe ſome Chy-

Chymists have written extravagantly enough upon a like subject; and because I have not yet made or seen the Experiment of it my self, I dare not yet give this new method of foretelling, for an instance of the Usefulness of Natural Philosophy to the Semiotical part of Physick. Though I dare not deny but by precipitations, and some other ways not yet vulgarly practiced of examining the Urine, made by the same Patient at several times, before, in, and after some notable alteration in his Body, divers things (especially in Feavors, and other acute Diseases) relating to the state of it, may be discover'd, especially if thereto be added a skilful and seasonable Chymical *Examen* of the other Excrements, and vitiated Substances of the Patients Body.

You will perchance expect, *Pyrophilus*, that on this occasion I should handle that controversie which is so hotly agitated, betwixt the *Paracelsians* and their Adversaries, concerning the curableness of all Diseases: But, for ought I can perceive, the difference betwixt the more sober Men of both parties, is more about Words then Things, and might be reduced to a much less distance, if Men could but calmly consider, That 'tis one thing to dispute, *Whether all Diseases be curable*; and another, *Whether all Persons be recoverable*: For a Disease may be call'd incurable, either in its own Nature, or by accident; that is, either because such a Disease is not to be cur'd in any Patient, or that it is so circumstantiated in this or that Patient, as not to be naturally curable in him. Now this distinction, duly consider'd, may conduce much to reconcile the two Opinions, if not the Parties that maintain them: For neither would a sober *Paracelsian* affirm (though *Paracelsus* himself doth somewhere seem to do so) That every Disease is curable in every Patient; there being some Palsies, Gouts, or Blindnesses, or the like, so obstinate, that (especially if they are born with a Man, or inherited from his Parents)

rents) the tone of ſome neceſſary or conſiderable part of the Body, being thereby rather aboliſhed, then barely vitiated, it were a folly to promiſe recovery to ſuch a Patient. And on the other ſide, a moderate *Galeniſt*, that is not unacquainted with the Diſcoveries which theſe latter Ages have made, of the power of Nature and Art, will not be forward to pronounce (as others do, and as the *Paracelſians* tax the *Galeniſts* too indiſcriminately for doing) That the Gout (for inſtance) the Dropſie, the dead Palſie, the Stone, are Diſeaſes univerſally incurable: Since, in the Writings of *Eraſtus*, and in the Obſervations of *Schenkius*, and others, there are Inſtances recorded of ſome Cures performed of the Dropſie, and one or two more of thoſe ſtubborn Diſeaſes, even by *Galenical* Remedies.

But, *Pyrophilus*, though we cannot but diſapprove the vain-glorious Boaſts of *Paracelſus* himſelf, and ſome of his Followers, who, for-all-that, lived no longer then other Men; Yet I think Man-kinde owes ſomething to the Chymiſts, for having put ſome Men in hope of doing greater Cures, then have been formerly aſpir'd to, or even thought poſſible, and thereby ingage them to make Tryals and Attempts in order thereunto. For not onely before Men were awaken'd and excited by the many Promiſes, and ſome great Cures of *Arnoldus de villa nova*, *Paracelſus*, *Rulandus*, *Severinus* and *Helmont*; Many Phyſitians were wont to be too forward, to pronounce Men, troubled with ſuch and ſuch Diſeaſes, incurable, and rather detract from Nature and Art, then confeſs that thoſe two could do what ordinary Phyſick could not. But even now, I fear there are but too many, who though they will not openly affirm, that ſuch and ſuch Diſeaſes are abſolutely incurable; yet if a particular Patient, troubled with any of them, be preſented, they will be very apt to undervalue

dervalue (at leaſt, if not) deride thoſe that ſhall attempt and hope to Cure him.

And I am apt to think, that many a Patient hath been ſuffered to die, whoſe Life might have been ſaved, if Phyſitians would have but thought it poſſible to ſave it. And therefore I think it were no ill piece of ſervice to Mankinde, if a ſevere Collection were made of the Cures of ſuch Perſons as have recovered after having been judg'd irrecoverable by the Doctors: That Men might no longer excuſe their own Ignorance by the impotency of Nature, and bear the World in hand, as if the Art of Phyſick, and their skill, were of the ſame extent. And the Cures that ſeem performed by Nature her ſelf, need not be left out of ſuch a Collection: For ſtill they ſhew what is poſſible to be done by Natural means, to evacuate the Morbifick matter, or alter its Nature (how dangerous ſoever it is grown) Or how far the tone of a part or ſtrength of the Body may be vitiated or impaired, and yet be capable of ſome reſtitution. And ſuch an obſervation I receiv'd from our moſt experienced *Harvy*, when, having conſulted him about my weak Eyes, he told me, among other things (as a very remarkable one) that he had once a Patient (whoſe Name and Profeſſion he told me, but I remember not) that had a confirm'd Cataract in his Eye, and yet upon the uſe of Phyſick, to which he could not aſcribe ſo wonderful an effect, that Cataract was perfectly diſſipated, and the Eye reſtored to its wonted Function. Which brings into my minde another Obſervation, imparted to me, a while ſince, by that excellent and experienc'd Lithotomiſt, Mr. *Hollyer*, who told me, that among the many Patients ſent to be cured in a great Hoſpital (of which he is one of the Chirurgions) there was a Maid of about eighteen Years of age, who, without the loſs of motion, had ſo loſt the ſenſe of feeling in the external parts of her

her Body, that when he had, for tryal sake, pinn'd her Handkerchief to her bare Neck, she went up and down with it so pinn'd, without having any sense of what he had done to her. He added, That this Maid having remained a great while in the Hospital without being cured, Dr. *Harvey*, out of Curiosity, visited her sometimes; and suspecting her strange Distemper to be chiefly Uterine, and curable onely by *Hymeneal* Exercises, he advised her Parents (who sent her not thither out of poverty) to take her home, and provide her a Husband, by whom, in effect, she was according to his Prognostick, and to many Mens wonder, cur'd of that strange Disease. That in acute Sicknesses, Persons given over by the Physitians, may recover, the more judicious, even of those *Galenists* that are of a dispondent temper, will not deny. For not onely *Celsus* gives us this sober admonition, *Neque ignorare aportet in acutis morbis fallaces magis notas esse & salutis & mortis*; But even *Hypocrates* himself, who was so skilful in Prognosticks, confesses, that *Morborum acutorum non in totum certæ sunt prænunciationes neque salutis neque mortis:* Whence the French have a Proverbial saying, that *Il vaut mieux estre condamné par les Medecins, que par le Prevost des Mareschaux*, as if in English we should say, *It is better to be condemn'd to die by the Doctor, then by the Judge.* And even in Chronical Diseases, where Events are wont much better to answer Physitians Predictions, there are sometimes such Cures performed, as may encourage humane Industry, and keep a sick Mans friends from forsaking the Cure of him, till Life it self have unquestionably forsaken him. For not onely it hath been not unfrequently seen, that divers Persons, who have been given over by some Physitians, have been cur'd by others, perchance rather more lucky then more skilful: But those that have been given over, and that too (sometimes rather upon the believ'd incurableness of the Disease, then the

perſonal Condition of the Patient) even by judicious and experienced Phyſitians, if ſuch as are acquainted but with the ordinary Remedies, have been recover'd by the uſe of extraordinarily powerful, and eſpecially, Chymical Phyſick. Of ſuch Cures I have ſometimes met with a few, which, becauſe I may elſewhere relate, I ſhall now onely mention, on this occaſion, what I have heard concerning the cures of Cancers, performed by Dr. *Haberfeld*, one of the principal Phyſitians of *Bohemia*. And among other relations, of this kinde, made me by credible Perſons, I cannot omit one, that was, Of a certain Engliſh Woman, of ſixty and odde Years of age, who had long lain in an Hoſpital in *Zeeland*, ſick of a Cancer in the Breſt, and by this Doctor was, with one ſingle inward Remedy, perfectly cured in the ſpace of three Weeks. For this relation was made me by perſons of very ſtrict veracity; the one a Doctor of Phyſick, who was an Eye-witneſs of the Cure; the other a Childe of *Cornelius Drebell*'s, who not onely ſaw the Cure, but knew the Woman before, and out of Charity brought her to him that heal'd her. The ſame Perſons likewiſe inform'd me, That the Chymical Liquor the Doctor conſtantly made uſe of, does, in the Doſe, of about a ſpoonful or two, work ſuddenly and nimbly enough by Vomit, but hath very quickly ended its operation, ſo that within an hour, or leſs, after the Patient hath taken it, he is commonly well again, and very hungry. And they having preſented me ſome ſpoonfuls of this Liquor, I finde the taſte to be offenſive enough, and not unlike that of Vitriol, which, by the taſte and emetick operation, I gueſs to be, at leaſt, its principal Ingredient, however it be prepared. The ſame Perſons aſſured me, that having obtain'd of Dr. *Haberfeld* a good quantity of his Specifick, they had been (in *England*, as well as elſewhere) partly Eye-witneſſes, and partly Performers of wonderful Cures by the help of it alone, under God,

God, in the Kings Evil. Insomuch that an eminent Gentleman of this Nation, now alive and healthy, hath been cured by it, when the Kings Evil had brought his Arm to that pass, that the Chirurgions had appointed a time to cut it off. And with the same Liquor, onely taken inwardly, they profess themselves to have seen and done divers Cures of inveterate external Ulcers, whose proud Flesh, upon the taking of it, is wont to fall off, and then the Ulcer begins to heal at the bottom; but of the recent effects of this Liquor, we may elsewhere, perhaps, further entertain you. That Suffusions or Cataracts, may, by a manual operation, be cured even in a Patient that was born with them, I formerly told you, when I related the Cure done by my Ingenious Acquaintance, Mr. *Stepkins*, on a Gentlewoman of about eighteen Years of age, that brought a couple of Cataracts with her into the World. And I remember I was somewhile since in the company of another Woman, who told me, She was brought to Bed of five Children (if I much mistake not the number) successively; of which, she saw not any in a long while after, by reason of a couple of Suffusions, that had many Years blinded her; and yet now, by the help of a Dutch Oculist of my Acquaintance, she sees, and reads well, and hath freely enjoyed the restored use of her Eyes for some Years already.

But these are rather Chirurgical, then Medicinal Cures, and therefore we shall subjoyn the Mention of a very memorable Observation of the Learned *Petronius*, which being collated with that a little above recited, from Dr. *Harvey*, they may serve to keep each other from passing for incredible: *Quidam* (says our Author) *qui antequam Morbo Gallico afficeretur, altero oculo cæcus erat, suffusione densissimâ (vulgus Cataractam vocat) oculum occupante, Hydrargyri inunctione à Morbo Gallico, & à suffusione, quod maximè mirum est, evasit. Neq; à ratione alienum est inunctione illa Cataractas posse dissolvi, cum fre-*

Alexand: Trajan Petronius, l.b. 5. De Mor: Gallico, c. 1. apud Skekium in Observ: lib. 1.

frequens Experientia doceat præduros tumores ex pituita craſſa & concreta, genitos, illitu Hydrargyri potenter diſſolvi.

I need not tell you what ſad Prognoſticks Phyſitians are wont to make of Dropſies, eſpecially of that ſort which they call *Aſcites*: And indeed the Event does but tóo frequently juſtifie their Predictions, when none but ordinary Remedies are employ'd. But I remember, that being acquainted with an Ingenious Perſon that was very happily cured of a Dropſie, and inquiring who it was that had perform'd the Cure; I was inform'd, that that, and a multitude of the like had been wrought by a *Germane* Phyſitian, of whom, and of his Remedy, I had heard much Commendation in *Holland*, where he liv'd: And though on divers occaſions I found him a modeſt Man; and accordingly, when I ask'd him concerning his Cures of the Dropſie, he anſwered me, That he neither did, nor would undertake to cure ſo formidable a Diſeaſe; yet he ſcrupled not to tell me, That as far as he had hitherto try'd, he had one Remedy which had not fail'd him, though he had try'd it upon perſons of differing Ages, Sexes, and Complections. But of this Specifick more hereafter. For, at preſent, I muſt proceed to take notice, that as incurable a Diſeaſe as the radicated Gout is thought to be (eſpecially in Patients not very temperate) and as tedious a courſe of Phyſick as one would expect to be requiſite to the Cure of it, in caſe it can be cur'd; Yet I have been ſeveral times viſited by an honeſt Merchant of *Amſterdam*, who was there noted for his Wealth, and his skill in *Arte tinctoriâ*: This Man, ten or twelve Years ago, had been for a long time ſo tormented with the Gout, both in Hands and Feet, that his Fits would ſometimes vex and confine him for a great part of the Year, and not leave him without hard Knots, as unwelcome Pledges of their Return: But once, that he was tortur'd to a degree that made h m much pity'd, one came and inform'd him of an Emperick, who had

receiv'd

receiv'd from a great Chymiſt who had lodg'd in his Houſe, a Secret, with which he had already throughly cur'd many, in a ſhort time: Whereupon ſending for this Perſon, and offering him any thing for ſome relief; the other refuſ'd to take above ten Crowns, which, as it ſeems, was the uſual rate for the Cure; and would not receive that neither, till the reality of it had been evinc'd by the Patients continuing above ſix Moneths well: And accordingly, with a very few Doſes of a certain Powder and Tincture, the Merchant was quickly free'd, not onely from his Pains, but from his Gouty *Tophy*: And though he indulge himſelf the drinking of Rheniſh Wine very freely, yet he never had a Fit ſince, as himſelf aſſur'd me one Morning, wherein, for Exerciſe ſake, he walk'd five or ſix Miles to give me a Viſit; adding, That the Man that cur'd him, dying ſuddenly, never could diſcover what the Secret was, wherewith ſo many had been freed from a Diſeaſe that does ſo often mock the skill of the greateſt Doctors.

I might, perhaps, if I had leiſure, relate to you ſome other ſtrange Stories, which may invite you to think, That as the Naturaliſts skill in Chymiſtry, and other Arts retaining to Phyſiology, may much aſſiſt him to diſcover more generous Remedies then are yet uſual; ſo the Knowledge of ſuch Remedies may, in divers caſes, make a happy Change in the Rules of Prognoſticating what will prove the Courſe and Event of a Sickneſs. But I ſhall not, at preſent, particularly conſider any more then one Diſeaſe, namely, The Stone in the Bladder. For whereas it is by moſt, even of the judicious Phyſitians, unanimouſly pronounc'd incurable by Phyſick, in what Perſon ſoever, if it deſerve the name of a Stone, and be too big to be voided whole, the Remedileſneſs of this Diſeaſe may be juſtly queſtion'd. I remember the famous *Monardes*, treating of the Seed of a *Peruvian* Plant, which they call *Chalchoos*, tells us, That it is highly eſteemed by the Inhabitants

habitants of the Country it grows in, and affirmed not onely to be diuretick, and to bring away Gravel, but to break the Stone in the Bladder it ſelf, if it be not too much hardned: *Ejuſq; rei* (adds he) *tam multa proferunt exempla ut admirationem mihi pariat*: He tells us indeed, that he is of opinion that nothing but Section can cure the Stone of the Bladder. *Aiunt tamen* (ſaith he) *illius ſemen* (of the Calchoos) *tritum, ex aquâ aliquâ ad eam rem idoneâ ſumptum, calculum in lutum diſſolvere, quod excretum denuo concreſcit & in lapideam duritiem convertitur. Adoleſcentem vidi cui hoc obtigiſſe ſcio, is cum veſicæ calculo torqueretur, idq; à Lithotomis qui calculum deprehenderant intellexiſſem, & ex Symptomatis quæ patiebatur agnoſcerem, hominem, veris initio, ad fontem, qui à Petro nomen habet, ablegavi, ubi cum duos menſes hæſiſſet à calculo liberatus redit & lutum omne quod paulatim ejecerat denuo in lapidum fragmenta concretum in charta ſecum retulit.* Which paſſage I wonder ſuch a Writer ſhould immediately annex, to the Declaration of an Opinion that muſt appear confuted by it, to a Reader that conſiders not ſo much what is thought, as what is proved.

The very learned and experienced Dr. *Gerard Boot*, of whoſe skill, you, *Pyrophilus*, have found very good effects in your Self, and who was one of the two Profeſſors that writ the *Philoſophia naturalis reformata*, had a very famous Remedy (which (now he is dead) I intend, God willing, to communicate) againſt the Stone; and with it he told me that he had very often cured that Diſeaſe in the Kidneys: but for the Stone in the Bladder, he thought it impoſſible to be diſſolved, which circumſtances I recite, that you may the more readily believe what he told me a little before his death, namely, That he had cured lately one Mr. *Moulin* of a real Stone in the Bladder; adding, That he could not brag of being the Inventor of that Remedy he had imployed, having but lately learned it of a Country

Country Gentleman, whom going to visit last Summer, he saw a Load of *Persicaria*, or *Arsmart*, brought to him by some of the Country People; and desiring to know what he intended to do with so vast a quantity of it, the Gentleman replyed, That he yearly used as much, having by the Water of it, made by bare distillation in a common Rose-water Still, cured so many of the Stone, even in the Bladder, that he was usually sollicited by Patients, numerous enough, to exhaust all the Liquor which he yearly prepared.

What we, *Pyrophilus*, have observed concerning this excellent Liquor, of which we use to prescribe a draught every morning for some Moneths together, we may elsewhere have occasion to relate. But now we shall go on to tell you, that being some Years since in *Ireland*, I met with an ancient Emperick, who was very famous in those parts, for cutting of the Stone of the Bladder, and for curing sore Eyes: This Man having given (in the Parts where I then was, and whilest I was there) some good proof of his skill, I sent for him to me, upon the account of a suspition I long had of the Stone in the Bladder, which, upon search, he assured me I was free from, and so (God be praised) I have afterwards found it. He was more a Traveller then a Scholar, and yet finding him, to my wonder, very modest and sober, I inqnired of him, Whether he had never any where met with a Remedy that could dissolve the Stone in the Bladder, offering him much more for a Cure of that kinde, then he would require as a Lithotomist: He answered me, That he could cure no Man of a confirmed Stone, but by the help of his Knife; but if the Stone consisted of a lump of Gravel not very firmly cemented together, he had, by a certain inward Remedy he used, and a dexterous way of crushing the Stone from without with his Fingers, so broaken the Stone, partly by crumbling it, and partly by dissolving the Cement, as to make it voidable by Urine. And

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he added, That he had formerly cured a Citizen of *Cork*, of a good large Stone of the Bladder (for where I then was, he gave proof of his skill, in telling before-hand those he was to cut, the bigness and shape of the Stones that troubled them.)

Passing afterwards by *Cork*, I sent an intelligent Servant to inquire after this Citizen, but he being casually absent, his Wife sent me, by my Man, a Relation very agreeable to that which he had made me: The Receipt I purchased of him, and, though it seem not very artificial, yet I suppose you will not quarrel with me for annexing so experienc'd a one, to the end of this Essay. But because this Remedy needed the assistance of a manual operation, We shall further proceed to tell you, That *Cardan*, as he is quoted by *Helmont* (for I have not now his Works by me) relates, That in his time there rambled a Man over *Lombardy*, who did commonly, and in a few days, by a certain Liquor which he administred to his Patients, safely, speedily, and certainly, cure those that were troubled with the Stone in the Bladder: Adding (saith *Helmont*) his Judgement, That he doubted not of this Mans being in Hell, for having, when he dyed, envyed Mortals so excellent an Art.

De Lith: c. 7. num: 14.

I insist not on the Testimony that the same *Helmont* gives to *Paracelsus* of his curing the Stone, though he often handle him very severely in other places of his Writings, because that the Epitaph of *Paracelsus* (out of which he labors to prove his having cured the Stone) makes no express mention of it. Nor shall I enumerate those Passages from whence the same *Helmont*'s Followers collect, That he himself was able to cure that Disease, by the resolution of *Paracelsus* his *Ludus*; but this experience hath evinc'd to me, that a much slighter preparation of that Stone, then was mention'd by *Paracelsus* and *Helmont*, hath been able to do more in that Disease then a wary Man

Man would readily believe. But to detain you no longer on this subject, I shall onely adde, That *Wilhelmus Laurembergius*, a learned Physitian, and Professor at *Rostoch*, hath told the World how he cured himself of a confirm'd Stone of the Bladder, by the use of prepared *Millepedes* (by some in English call'd *Woodlice*) and other Remedies, which he hath particularly recorded in the History which he hath publish'd, and I have seen of this admirable Cure: which having been epitomized by *Sennertus*, and other eminent Physitians, I shall not need to insist on it. And the Arguments alledged (even by the most Judicious) against the curableness of the Stone, though very plausible, seem not to me unanswerable; for whereas first, they appeal to the innumerable fruitless attempts that have been made to cure great Princes, and rich Men, without cutting, that Argument drawn from experience, may, by the former Experiments, be answered; especially since *Horatius Augenius* (upon whose account *Laurembergius* tryed *Millepedes*) tells us, not onely that he cured a young Man at *Rome*, that was going to be cut for the Stone, but that the Jesuite that chanced to confess this Youth, and perswaded him to the use of *Millepedes*, had experimented their efficacy both upon himself and others: And indeed, we our selves have found them to be highly Diuretick and Aperitive.

And whereas it is next objected, That Medicines must necessarily loose their efficacy before they can reach the Bladder, I confess, that for the most part, it is very true: But yet that it is possible for some Medicines to retain their Nature, after many alterations and digestions we have elsewhere declared. And in our present Case, we not onely finde that Turpentine and Asparagus, do manifestly affect the Urine (as I have often observed in my own, and almost any Man may observe it

in his) But that which is most to our purpose, *Rubarb* tinges the Urine of those that have taken any quantity of it. And lastly, whereas it may be yet further alledged, That not only there hath not been yet a Liquor found capable of dissolving so solid a Body as a Stone; but if there were, it must necessarily be so corrosive as to destroy the Patient, by fretting his Stomach, or Guts, or Bladder, which are parts so much more tender. To the first part of this plausible Objection it may be replyed, That even good Viniger will dissolve, not onely those stony Concretions, call'd *Lapides Cancrorum*, which, like the *Calculi* we treat of, are formed in the Bodies of Animals; but even the more hard and solid Body of Coral, which will loose but little of its weight, in a Fire that would waste a great part of the *Duelech*: And that the bare Juices of Vegetables (such as Lemmons and Barberies) will readily dissolve both Pearl and Coral, is known even to the Apothecaries Boys. Indeed what *Paracelsus* and *Helmont* relate of their *Alkahest*, with which they prepare their Specifick against the Stone, and with which the later of them, if not both, pretend to be able to reduce, not onely the Stone they call *Ludus*, but all other Stones, Vegetables, Minerals, Animals, *&c.* into insipid Water, is so strange (not to say incredible) that their Followers must pardon me, if I be not forward to believe such unlikely things, till sufficient experience hath convinced me of their truth.

But yet I must not conceal from you, That a Chymist, whom you have often seen, advised with me several times about the way of preparing this immortal Liquor (as *Helmont* calls it) and that, when we had agreed that such a way was the most promising, he prosecuted it so long, and so industriously, that at length he obtain'd, and shew'd me a Liquor, which (though it seemed to me far short of the *Alkahest*) I confess I ad-

admired; and not I alone, but our Ingenious Friend Dr. *C.* (who had been imployed into several parts of *Europe*, by a rich and curious Prince, to purchase Rarities) agreed with this Chymist, to give Two hundred Crowns for a Pint of this *Menstruum*; and confessed to me withal, That he saw him, with this Liquor, not onely dissolve common *Sulphur*, and bring it over the Helm, but reduce Antimony into sweet Chrystals; with a few of which it was, that he (I mean Dr. *C.*) to the wonder of many, did, without Purge or Vomit, cure our good Friend Sir *C. C.* of a very radicated and desperate Disease, as the restored Patient soon after told me. And to the second part of this Objection it may be answered, That if we knew and considered well, how many of the operations of Natural Bodies depend upon the suitableness and difference of the Figures of their Parts, and the Pores intercepted between them, the number of impossibilities would not, perhaps, be thought so great, as by many Learned Men it is.

That it is very possible for a Body to have an effect upon another determinate Body, without being able to operate, in like manner, upon a multitude of other Bodies, which may seem more easie to be wrought on by it; may appear by the Load-stone, which will draw and work onely upon Iron, and (which is but refined Iron) Steel, but not upon wood or straws, or any of those innumerable Concrets that are lighter, and of a more open texture then the heavy and solid Body which it attracts. And to give you an instance that comes nearer to our case, Quick-silver, that will not corrode our skin, nor so much as taste sharp upon our tongue, will yet readily dissolve that most compact Body of Gold, which even *Aqua fortis*, that can insinuate it self into all other Mettals, and corrode them, will not meddle with; though the same Quick-silver will not dissolve Iron, which yet *Aqua fortis* will very nimbly

fret asunder. So that although I dare not confidently believe all that I have found averr'd even by eminent and learned Chymists, of their having made or seen Liquors, which, without appearing any way sharp to the Tongue, would dissolve Gold and Silver, and other hard compact Bodies; because I have not yet, my self, seen any severe and satisfactory tryal made to evince the efficacy of insipid Dissolvents: yet, by reason of divers things I have read and heard, and of some things too I have seen, I dare not peremptorily deny the possibility of such *Menstruums*. And who knows, but that in Nature there may be found, or by Art there may be prepared, some Liquor, whose parts may have such a suitableness to the Pores of a humane *Calculus*, as those of Quick-silver have to the Pores of Gold, and yet may as little work upon the rest of the Body, as we have observed the same Quick-silver to do upon Iron (which yet is a much more porous and open Metal) even when it hath been distill'd in Iron Vessels? And as to that part of the Objection wherein the strength of it chiefly lies, let me tell you, *Pyrophilus*, that I have sometimes, for curiosity sake, taken an Egge, and steep'd it in strong Vineger for some days, and by taking it out, and shewing that the shell was so eaten away, that the Egge could be squeez'd into unusual Forms, but the thin skin that involves the white continu'd altogether unfretted, I convinc'd an Ingenious Man, that the operations of Dissolvents are so determin'd by the various textures of the Bodies on which they are imploy'd, that a Liquor, which is capable to corrode a more hard and solid Body, may be unable to fret in the least, an other more soft and thin, if of a texture indispos'd to admit the small parts of the *Menstruum*. And I must confess to you, *Pyrophilus*, That one thing, among others, which hath made me backward to affirm with many Learned Men, that there can be no

no potent Dissolvent that is not corrosive enough to fret in pieces the parts of a humane Body, hath been a Story, which I divers years since chanc'd to meet with in the Learned *Sennertus's Paralipomena*, where, though he relates it to another purpose, yet it is so pertinent to our present design, and in it self so singular, not to say matchless, that I cannot forbear to mention it here on this occasion. He tells us then, That in the end of the Year, 1632. *Johannes Nesterus*, an eminent Physitian, and his great Friend, inform'd him, That there liv'd at that time in the Neighborhood, and belonging to a Noble Man of those Parts, a certain *Lorainer*, whom he also call'd *Claudius*, somewhat low and slender, and about 58 Years of age: *Hic* (saith he) *nihil fœtidum, nihil injucundum abhorret; Vitra, Lapides, Ligna, Carbones, Ossa, Leporinos, & aliorum animalium pedes cum pilis, lineos, laneosq; pannos, viva animalia & pisces adhuc salientes, imò etiam Metalla, patinas & orbes stanneos dentibus confringere & vorare sæpissime visus est; Vorat præterea lutum sevum & candelas sebaceas, integras testas cochlearum, animalium stercora, cum primis bubulum calidum adhuc, prout è matrè venit: potat aliorum Urinas cum Vino & cerevisia mixtas, Vorat fœnum, stramen, stipulas & nuper duos mures viventes adhuc deglutivit, qui ipsius ventriculum ad semihoram usq; creberrimis morsibus lancinarunt, & ut brevibus complectar, quicquid illi à Nobilibus devorandum offertur, vilissimâ mercede propositâ, dictum ac factum, ingurgitat, ita ut intra paucos dies integrum vitulum crudum & incoctum cum corio, & pilis se estaturum promiserit. Testis inter alios quamplurimos ipse ego sum, quippe qui, &c.* To this, and the following part of the Letter, *Sennertus* addes, That not having, during some Years, heard any thing concerning this *Claudius*, he sent about four Years after to the same Physitian, Dr. *Nesterus*, to enquire what was become of him; and that

Medicus Rochlizensis.

that the Doctor sent him back a Letter of the Minister of the Church of that place, by way of confirmation of all the formerly mention'd particulars, and answered himself, That the *Lorainer* whom he had long hop'd to dissect, was yet alive, and did yet devour all the things mention'd in his former Letter; but not so frequently as before, his Teeth being grown somewhat blunter by age, that he was no longer able to break Bones and Mettals. Some other examples of this nature, though none so strange, we have also met with in Writers of good credit, and especially that of the Glass-eater, recorded by *Columbus* in his excellent Anatomical Observations; of which also *Sennertus* makes mention, as we shall see by and by, and with which we may elsewhere entertain you to another purpose. And not long agoe there was here in *England* a private Souldier (who, for ought I know, is yet alive) very famous for digesting of Stones: And a very inquisitive Man, that gave me the accurateſt account I have met with concerning him, assures me, That he knew him familiarly, and had the curiosity to keep in his company for 24 hours together to watch him, and not onely observ'd that he eat nothing in that time, save Stones (or Fragments of them) of a pretty bigness, but that his grosser Excrement consisted chiefly of a sandy Substance, as if the devour'd Stones had been in his Body dissolved and crumbled into Sand. But let us not omit, that to the second Epistle above-mention'd, *Sennertus* addes this Reflection, not impertinent to our purpose: *Causam* (says he) *hujus voracitatis, etiam in cadavere, invenire proculdubio erit difficillimum. Posset quidem ad illud, quod in cadavere Lazari Vitrivoracis observavit Columbus, quidam confugere; & statuere quartam illam nervorum conjugationem, quæ gustus gratia in hominibus à natura producta est, neq; ad Palatum, neq; ad Linguam pertendere. Verum hoc modo saltem gustûs aboliti causa redderetur, non-*

nondum vero causa daretur, cur res tam miras assumere sine ventriculi læsione, imo concoquere potuerit. Quæ proculdubio in ἰδιοσυγκρασία & peculiari constitutione ventriculi & intestinorum quærenda esset: quæ tamen oculis investigari non potest sed saltem ex effectu patet. And indeed this memorable Story seems to argue, not onely what we have already alledg'd it to prove, but also that a *Menstruum*, not so corrosive as to fret the Body, may dissolve Stones, Metals, and other compact Substances. And since one Liquor, prepar'd by Nature onely, could in this Mans Stomack dissolve that great variety of Bodies above enumerated, why should it be thought that the Alkahest, or some other *Menstruum* wherein Nature is skilfully assisted, and to the utmost highten'd by Art, should not be able to dissolve Concretes of very differing Textures. For though Chymists must acknowledge that such common *Menstruums* as will dissolve one Body, will not oftentimes meddle with another; as *Aqua fortis* will dissolve Silver, and not Gold, and if by *Sal armoniack* you turn it into *Aqua Regis*, it will indeed dissolve Gold, but then it will not Silver: Yet since that may be suppos'd to proceed rather from our want of skill to prepare the most potent *Menstruum*, then from the impossibility of one *Menstruums* dissolving great variety of Bodies; Why may not Nature and Art afford a *Menstruum*, whose variety of Parts, and Figures, and (perhaps also) Motion, may give it ingress into Bodies of very differing Textures? as in our former Instance, though *Aqua Regalis* will dissolve Gold, not Silver; and *Aqua fortis* Silver, but not Gold; yet Quick-silver will dissolve both, and Copper, Tin, and Lead to boot.

If I were not at present under some restraint, I might tell you, some things, that you would, perhaps, think no weak Confirmations of the past Discourse: And however, since I have

have obſerv'd it to be the main thing, that keeps judicious Men from ſeeking, or ſo much as hoping for nobler Diſſolvents, that they are ſcarce to be perſwaded there can be conſiderably piercing *Menſtruums*, that are not proportionably corroſive: I will here acquaint you with a Liquor, that may, I preſume, aſſiſt you to undeceive ſome of them. We take then ordinary houſhold brown Bread (I like that of Rye, but I have divers times uſ'd that of Wheat) and when it is cut into ſlices, and ſomewhat dry'd, we almoſt fill a glaſs Retort with it, and placing that in a ſand Furnace, by degrees of Fire, we draw off what will be made to come over, without much difficulty: The Oyl, as uſeleſs to our purpoſe, being by a Tunnel, or a Filter, ſever'd from the reſt of the Liquor, we alſo, by a gentle heat, free the Spirit from ſome of its Phlegm, which yet ſometimes we finde no great neceſſity to do. And yet this Spirit, which you will eaſily believe is no ſuch Corroſive as *Aqua fortis*, or other diſtill'd Liquors of Mineral Salts, will work upon the hardeſt ſorts of Bodies, and perform things that Chymiſts counted of the judicioueſt, would not have us expect from the moſt ſharp and corroſive *Menſtruums* now in uſe. For with this we have, in a ſhort time, and that in the cold, drawn Tinctures (wch is done by the ſolution of the finer parts of the Concrete) not only from crude Corals, and ſome of the more open Minerals, but likewiſe from very hard Stones, ſuch as Blood ſtone, and Granates (even unpowder'd) Nay, and though Ruby's ſeem to be the hardeſt Bodies yet known, ſave Diamonds (for I have learned from thoſe that cut precious Stones, that they can grinde other Gems with the Powder of Rubies, but not theſe with any Powder, ſave their own, and that of Diamonds) yet have, even theſe, afforded me in the cold, a not ignoble Tincture. And not to anticipate what I may elſewhere have occaſion to tell you concerning the

the efficacy of this *Menſtruum*, which is the ſame that I have intimated, without naming it, in the laſt, and another of the former Eſſays. I ſhall now onely adde, That an expert Chymiſt aſſures me, he hath, but tells me not how, done greater matters with it, or the like; and that to ſatisfie my ſelf that theſe high Tinctures, proceeded not from the ſtanding or digeſtion of the *Menſtruum* (as we elſewhere obſerve concerning ſome other Liquors) I not onely tryed, that from ſome Minerals it will draw a much higher Tincture then from others, and from ſome ſcarce any at all, but that it would, if kept by it ſelf, for many Moneths continue clear and limpid. What further uſe I have made, or think others may make of this odde *Menſtruum*, I muſt not, as I ſaid at preſent, expreſs; but returning to what I was diſcourſing concerning the cure of the Stone, annex, That beſides what hath been objected againſt the poſſibility of making a Liquor, which, without being highly corroſive, can be able to work upon Stone; It may indeed be alſo alledg'd againſt the hopes we ſeem to countenance, that what hath cured the Stone in one Mans Bladder, may be unable to do the like in anothers: But firſt, the truth of that hath not been proved; and next, we highly value thoſe Specificks that can remove Agues, Fluxes, and the like Diſeaſes, though ſcarce any of them do alike ſucceed in all Patients, eſpecially ſo as to ſecure them, during their whole lives, from ever relapſing into the like Diſeaſe; and beſides all this, it will be no ſmall matter to finde that the Diſeaſe, in its own nature, is not incurable; and it would recompence Mens Induſtry to be able to free, even a few Patients, from ſo painful and ſtubborn a Diſeaſe. Which I have rather then any other, choſen to inſiſt upon, becauſe it is ſo generally believed not to be curable by inward Remedies in any Perſon whatever.

But I have entertained you so long on this subject, that I must reserve, for some other opportunity, what I have to say to you concerning the Dropsie, and some other Diseases, commonly put into the Catalogue of the incurable ones, and therefore shall now onely tell you in general, That as on the one side I think the Arguments which *Helmont* and others draw from the Providence of God, for the curableness of all Diseases are not very cogent, and somewhat irreverent (For God being not oblig'd any more to continue Life or Health to sinful Man then to Beasts that never offended Him, we ought humbly to thank Him, if He hath, among His Creatures, dispers'd Remedies for every Disease, but hath no right to accuse Him if He have not) so on the other side, I am not much convinc'd by the grand Argument alleadg'd against *Paracelsus*, and the Chymists, that hold all Diseases to be in their own Nature curable; namely, That they themselves, many of them (no nor even their very Master) lived not to the Age attain'd by many Strangers to Chymistry.

For this, That many of them (not destroy'd by War, or outward accidents) died young enough, and consequently by Sickness; and that *Paracelsus* himself out-liv'd not the 47th Year of his age, is a much stronger Objection against the Men, then against their Opinion; for it infers indeed plausibly, that they had not such Remedies as they boasted of (since probably, had they had any such, they would have cured themselves with them) but concludes not that no such Remedies can be prepar'd by any other. And this you will be the less apt to think irrational, if you consider, how much more learned, sober and experienc'd, it is possible for many a Man to be, then *Paracelsus* appears to have been: For he seems not by his Writings to have been any great Logician

or

or Reasoner; he manifestly despis'd many parts of Learning, useful to a Physitian; he lived not many Years, and spent divers of those few which he lived, in an unsetled and disadvantagious course of life; and yet this *Paracelsus* attain'd to some such Remedies, as both in his own, and after times, have made him a very considerable Person, in spight of all his indiscretions and deficiencies. And among his other Remedies, his famous *Laudanum* did such wonders, that *Oporinus* himself, in that short account, which seems to be rather a Satyr then a Narrative of his Life, hath this Passage of it: *De Laudano* (saith he) *suo* (*ita vocabat pilulas instar murium stercoris, quas impari semper numero, in extrema tantum morborum difficultate, tanquam sacram medicinam exhibebat*) *ita gloriebatur, ut non dubitarit affirmare ejus solius usu se è mortuis vivos reddere posse; idque aliquoties dum apud ipsum fui, re ipsa declaravit.* So signal a Testimony coming from one whom the *Paracelsians* call his fugitive Servant, hired by his Enemies to slander him, under pretence of writing his Life, deserves not to be slighted: and though it manifestly contains an *Hyperbole*, yet I do the less wonder at the *Hyperbole*, by reason of those strange things which your Mother, and divers other of your Friends, can tell you, they have seen performed in *England* by *Helmont*'s *Laudanum opiatum* (though much inferior to that of *Paracelsus*.) And I remember, that a Friend of yours and mine, that is a great enemy to all kindes of Chymical Remedies, and was before also to Chymistry, having begg'd of me a little Bottle of it, which I had obtain'd from a Friend of the younger *Helmont*'s, to whom he communicated the Preparation, gave me awhile after, an account of such Cures that had been perform'd, with that small quantity, upon almost dying Persons, as I think it not discreet for me, that was not

an Eye-witneſs of them, to relate. And I remember too, that the ſame Friend of young *Helmont*'s, being, at the perſwaſion of one Woman whom he had cured of a dangerous Conſumption, call'd to another that was thought to be dying of an *Aſthma*, came to adviſe with me whither he ſhould meddle with ſo deſperate a Patient; telling me, That ſhe had been many Years ſick of that ſtubborn Diſeaſe, which, in proceſs of time, paſſing into an *Orthopnea*, had at laſt put her, by want of ſleep (from which the violence of her ſickneſs had very long kept her) into a Feaver, and ſo deſperate a condition, that it was ſcarce expected ſhe ſhould live till the next morning. But I, repreſenting to him that her condition being avowedly deſperate, he might exerciſe his Charity without danger to his Reputation; and perſwading him to try *Helmont*'s *Laudanum*, together with the Spirit of Man's Blood (which we elſewhere teach you to prepare) he gave her that Night a Doſe of thoſe Remedies, which made her both ſleep and breath pretty freely; and a Week after, he coming to viſit me, told me, he had caſually met his Patient well and abroad in the Streets. But theſe are trifles to the Cures which *Helmont* relates to have been performed by our *Iriſh Butler*, for he tells us, That this Man, by ſlightly plunging a little Stone, he had, into Almond Milk or Oyl, imbued thoſe Liquors with ſuch a ſanative efficacy, that a Spoon-full of the former cured (and that without acquainting him with what was given him) a *Franciſcan Frier* (a very famous Preacher) of a very dangerous *Eryſipelas* in the Arm, in one hour; and one drop of the latter, being apply'd in his preſence, to the Head of an old Laundreſs, that had been ſixteen Years troubled with an intolerable *Hemicrania*, the Woman was preſently cured, and remained ſo, to his knowledge, for divers Years. He adds almoſt as ſtrange a Cure done in one Night,

Helmont in the Treatiſe which he entitles *Butler*.

Night, upon a Maid of his Wife's, by anointing the part affected with four drops of that Oyl: He further tells us, That the Master of the Glass-house at *Antwerp*, being troubled and made unweildy with too much fat, begg'd some relief of *Butler*; who, having given him a little fragment of his little Stone, with order to lick it nimbly with the tip of his Tongue once every Morning, I saw (saith *Helmont*) within 3 weeeks, the compass of his waste lestned by a span, without any prejudice to his health. And to these, *Pyr*: he adds some other Narratives, which, though I confess I know not well how to believe, yet there are Circumstances which keep me from daring to reject them: For first, as he well observes, that which was most stupendous in this Remedy, was but the smalness of the quantity. Next, a Gentleman in *France*, being not long since reported to have a fragment of this Stone, and to have cured several Persons (and especially one very dignified) of inveterate Diseases, by leting them lick it; my Noble Friend Sir *Kenelm Digby*, then in *France*, was solemnly requested from hence to inquire into the truth of that Report, and answered, That he could not, upon examination, finde it other then true. Besides, *Helmont* not onely relates these Cures as an Eye-witness of them, but tells us, how upon an occasion that he mentions, he once suspected the efficacy of the Oyl, and that, without expecting that it should do any thing, he anointed it on the right arm and the ancles of his own Wife, who had for some Moneths been tormented with great pains in the former, and very great tumors in the latter of those parts; and that almost in a trice, motion was restored to her arm, and all the *œdema* of her legs and feet vanished; adding, That at the time of his writing she liv'd healthfully, and had done so since that recovery, during nineteen Years: And this Story, she, long after her Husbands death,

death, confirm'd to our ingenious Friend Dr. *C.* who is acquainted with her, and much extolls her: These Circumstances, may be assisted by two more very considerable ones; the one is, That *Helmont* is the more to be credited in these Relations, because mentioning Cures not perform'd by himself, but by another, and that by Remedies unknown to him, he seems by these Narrations, out of loyalty to truth, to eclipse his own Reputation: And the other is, that in a memorable Story which we may elsewhere relate to you (it being not here proper to insert so long a one) you'l finde an eminent and strange testimony given to *Butler*'s Secrets, by our famous Country man, Dr. *Higgins*, whose confession you will not doubt, if you consider how rare a Physitian and Chymist he was, how familiarly he lived in the same House with *Butler*; and how studiously, at last, they endeavored to take away each others Life.

But whatever be to be thought, *Pyr*: of *Helmont*'s Relation, we may well enough make this reflection on the other things that have been delivered concerning formidable Diseases, that since the power of Nature and Skill may reach much farther then many distrustful (not to say lazy) men have imagin'd, it will not be charitable to rely too much upon the Prognosticks, even of famous Writers, when they tell us, That such and such Diseases, or Patients in such and such conditions cannot possibly be cured. But rather to follow the sober councel of *Celsus*: *Oportet* (saith he) *ubi aliquid non respondet, non tanti putare Authorem quanti agrum, & experiri aliud atque aliud.* And this great Physitians authority I therefore make the most use of in the ensuing Essays, because he is accounted very judicious by the Lord *Verulam*, and other Writers that are unquestionably so themselves.

De Medicina, lib. 3. cap. 10.

ESSAY

ESSAY IV.

Presenting some things relating to the Hygieinal Part of Physick.

THat the Dietetical part of Physick, *Pyrophilus*, may, as well as the others, be improved by Natural Philosophy, were not uneasy to manifest, if my haste would permit it: For 'tis known, that Drinks make a very considerable part (sometimes, perchance, amounting almost to the one half of our Aliments) and most Drinks, as Wine, Beer, Ale, Mead, *&c.* consist of fermented Liquors: Now as on the one side the ignorance of the Doctrine of Fermentation, and of the wholesome way of both preserving Liquors and making them pleasant, doth questionless occasion more then a few Diseases, which in divers places may be observed evidently to proceed from the unwholsome quality of either ill made, or sophisticated Drinks; so on the other side, the distinct knowledge of the true nature and particular *Phænomena* of Fermentation, would enable Men to prepare a great variety of Drinks, not onely as harmless, but as beneficial, as pleasant.

How much preparation may do to correct and meliorate both hard and liquid Aliments, is notably instanced by the account that we receive from both the French and English that inhabit the *Barbados*, *St. Christophers*, and other *Caraibes* Islands,

Islands, who solemnly inform us (what is attested also by *Piso*, and other Learned Travellers that write of it) that the Plant *Mandioca* (whose prepar'd Root makes *Cassavy*, and which we have also seen flourishing here in *Europe*) to which the *Indians* are so much beholden, is a rank Poyson. And though I shall not too resolutely affirm it, to be a Poyson properly so called; yet in confirmation of its being very noxious, I shall tell you, That having purposely enquired of a very intelligent Gentleman, who commanded an Army of *Europeans* in *America*, what experience he had seen of the qualities of this Plant, he told me, That between thirty and forty of his Soldiers, having on a time (whil'st they were unacquainted with the Countrey) either through ignorance or curiosity, eaten of it unprepared, it cost most of them their Lives. And yet this pernicious Root, which some Herbarists call *Yucca*, by the rude *Indians* ordering, comes to afford them both almost all their Bread, and no small part of their Drink: For this Root being grated, and carefully freed from its moisture, by being included in Bags, and very strongly presled till all the Juice be squeezed out; it is afterwards dryed in the Sun, and so made into the Meal of which they make their Bread: And this very Root, though (as we said) it be poisonous, they cause their old, and almost toothless Women, for the better breaking and macerating ir, to chew and spit out into Water. This Juice will, in a few hours, work and purge it self of the poysonous quality, affording them a Drink which they esteem very wholsome, and at the *Barbado*'s call *Perino*, and account it to be the likest in taste to our English Beer, of any of those many Drinks that are used in that Island.

History of the *Barbado*'s, pag. 29, 30, 31, 32.

This nasty way of preparing Drink, *Pyrophilus*, may seem strange to you, as it did to me when I first heard of it; but

but besides the consenting relations both of French and English concerning it, it may be confirmed by the strange assertion of *Gulielmus Piso*, in his new and curious *Medicina Brasilienſis*, where, having spoken of several of the *Brasilian* Wines, he tells us, That they make Liquors of several Plants, besides the Root of *Mandioca*, after the same nasty manner. *Idem fit* (saith he) *ex Mandioca, Patata, Milio, Turcico, Oryza & aliis, quæ à vetulis masticantur, masticataq; multa cum salira exspuuntur, hic liquor mox vasis reconditur donec ferveat, fæceſque ejiciat.* *Voyage de Muſcovie & de Perſe, p.m. 23.*

In *Muscovia* it self, notwithstanding the unskilfulness of that rude People, *Olearius* informs us, That the Embassadors, to whom he was Secretary, were presented at one time with two and twenty several sorts of Drink. And at a Country House here in *England* (where I was, by a very Ingenious Gentleman that is Master of it, presented with divers rare Drinks of his own making) I was assur'd that he had lately, at one time in his House, at least the former mentioned number of various Drinks, and might easily have had a greater, if he had pleased.

And on this occasion, I am not willing to pretermit what is practised in some of our *American* Plantations, as I am informed by the Practisers themselves, where, finding it very difficult to make good Mault of Maiz, or Indian Corn (by reason of hinderances not to be discoursed of in few words) they brew very good Drink of it, by first bringing the Grain to Bread; in which operation, the Grain being both reduced into small parts, and already somewhat fermented, is disposed to communicate easily its dissoluble and Spirituous parts to the Water it is boyled in: To which I shall adde, That I have to think, that the Art of Malting may be much improved by new & skilfully contriv'd Furnaces, and a rational management of the Grain.

Nor are we alone defective in the knowledge of fermenting Drinks, but even in that of the Materials of which Drinks may be prepar'd.

In that vaſt Region of *China*, which is inriched with ſo fertil a Soil, and comprizeth ſuch variety of Geographical parallels, they make not (as *Semedo* informs us) their Wine of Grapes, but of Barley; and in the Northern parts, of Rice, where they make it alſo of Apples; but in the Southern parts, of Rice onely: yet not of ordinary Rice, but of a certain kinde peculiar to them, which ſerves onely to make this Liquor, being uſed in divers manners. And of the Wine there drank, even by the vulgar, our Author gives us this character: The Wine uſed by the common People, although it will make them drunk, is not very ſtrong or laſting; 'tis made at all times of the Year, but the beſt onely in the Winter: It hath a colour very pleaſing to the ſight, nor is the ſmell leſs pleaſing to the ſent, or the ſavor thereof to the taſte; take altogether, it is a vehement occaſion that there never wants Drunkards, *&c.* And of the Inhabitants of the Kingdom of *Japan*, I remember alſo, *Pyrophilus*, that *Linſchoten*, in his deſcription of thoſe Iſlands, tells us, That they drink Wine of Rice, wherewith they drink themſelves drunk.

History of *China*, *par.* 1. *cap.* 1.

Linſchoten's Voyages, Book 1. Chap. 26

We have here in *England*, at the Houſe of our experienced Mint-maſter, Dr. *Gordon*, taſted a Wine, which he made of that ſort of Cherrys which are commonly call'd *Morellos*, that was, when we drank of it, about a Year and a half old, but it was ſomewhat ſower, and needed Suger; And therefore I ſhall rather take notice to you of my having ſince drunk Wine made of the Juice of good, but not extraordinary Kentiſh Cherrys, which, with the help of a *Tantillum* of Suger added in the Fermentation, kept ſo well, that though it

it were above a Year old when I tasted it, I found it a strong and pleasant Wine, not inferior to many Wines that are brought us from foreign parts. But this is nothing to what is averr'd upon his own experience, by a Learned Divine (to whom you, *Pyrophilus*, and I, am related) who affirms himself to have made out of some sort of wilde Apples and Pears, by bare Fermentation, such Liquors, as though at first somewhat harsh, will not onely keep divers years; but at the end of two or three, attain such strength, and so pleasingly pungent a taste, that they may compare even with choice out-landish Wines, and excel those that are not of the very best sorts of them.

But till we have in another Essay an opportunity of presenting you something out of the Observations of *Olearius*, the newly mention'd Divine, and our own, concerning Fermented Liquors, we shall content our selves to manifest our want of curiosity about the materials of which Drinks may be prepar'd, by this, That the Drinks of one whole Country, are oftentimes unknown to the Inhabitants of another: That the Wine made of Rice, which we lately mention'd to be of frequent use in the Kingdoms of *China* and *Japan*, is of little or none in *Europe*, I need not prove to you. I have been in divers places where Beer and Ale, which are here the common Drinks, are greater rarities, then the medicated Liquors sold onely in Apothecaries Shops. In divers parts of *Muscovie*, and some other Northern Regions, the common Drink is *Hydromel*, made of Water fermented with Honey: And indeed, if a due proportion betwixt those two be observed, and the Fermentation be skilfully ordered, there may be that way, as experience hath assur'd us, prepar'd such a Liquor, both for clearness, strength, and wholsomeness, as few that have not tasted such a one, would readily believe.

The French and Englisch Inhabitants of the Canibal Islands, make, by Fermentation, a Wine of the dregs collected in the boiling of Suger. A like to which *Piso* tells us, That they make in *Brasil*, and commonly call *Garapa*, which, though made by the mixture of Water, the Inhabitants are very greedy of; and when it is old, finde it strong enough to make them drunk. And how also in these colder Countrys, a good Wine may be made of onely Suger and Water, we may elsewhere have occasion to teach you.

Lib. 4. *Cap.* 1.

Lib. 4. *Cap.* 6.

And in *Brasil* they likewise, as the same Author informs us, make a Wine (unknown to most other Regions of the World) of the Fruit of *Acaju*, which yet, upon his experience, he much commends; telling us, That it is strong enough to inebriate, and may, he doubts not, be kept good many Years; and that though it be astringent, yet both in himself and others he found it diuretical.

In the *Barbada*'s they have many Drinks unknown to us; such as are *Perino*, the Plantane-drink, *Grippo*, *Punch*, and the rare Wine of Pines, by some commended more then the Poets do their Nectar; some of which we therefore make not, because the Vegetables whereof they are produc'd, grow not in these colder Climats: But others also they have, which we have not, though they are made of Plants to be met with in our Soil; as for instance, the drink they call *Mobbie*, made of *Potato*'s fermented with Water, which, being fit to drink in a very few days, and easie to make as strong almost as the maker pleaseth, would be of excellent use, if it were but as wholsome as it is accounted pleasant.

In the *Turkish* Dominions, where Wine, properly so call'd, is forbidden by *Mahomet*'s Law, the Jews and Christians keep, in their Taverns, a Vinous Liquor made of fermented

ed Raisons, after a manner, which (when we shall elsewhere acquaint you with it) you will easily discern to be capable of much improvement from the knowledge of Fermentation. And indeed, by the bare fermenting of Raisons and Water in a due proportion, without the help of Barm, Leaven, Tartar, or other additament to set them a working, we have divers times, in a few days, prepar'd a good Vinous Liquor, which having for tryals sake distilled, it afforded us greater store, then we expected, of inflammable Spirit, like that of other Wine.

But I have sometimes wondered, that Men had no more curiosity to try what Drinks may be made of the Juices obtainable, by wounding or cutting off the parts of several Trees, and some other Vegetables: For that in the *East Indies*, their *Sura* is made of the Liquor dropping from their wounded *Coco* Trees, we have not long since out of *Linscoten* informed you. And sober Eye-witnesses have assured us, That in those Countrys they have but too often seen the Seamen drunk, by the use of Liquors weeping out of the Incisions of wounded Vegetables, and afterwards fermented.

And that even in *Europe*, the Alimental Liquor, drawn by Trees from the Earth, may receive great alterations from them before it be quite assimulated by them, may be gathered from the practice of the *Calabrians* and *Apulians*; who, betwixt *March* and *November*, do by Incisions obtain from the common Ash Tree, and the *Ornus* (which many Botanists would have to be but a wilde Ash) a sweet Juice, so like to the Manna, adhearing in that Season to the Leaves of those kinde of Trees, that the Natives call it in their Language, *Manna del corpo*, or *Trunk-manna*; and least we should think they draw all this sweetness from the Soil of that particular part of *Italy* where they grow, you may be satisfied by the

Learned

Learned *Chryſoſtomus Magnenus*, in his Treatiſe *De Manna*, that it is to be met with in ſeveral other places. And he adds, That in the Dukedom of *Milane*, where he profeſſeth Phyſick, there is no other Manna uſed then that which is (as he ſpeaks) *Vel è trunco expreſſum* (which he ſomewhere calls *Manna Truncinum*) *aut in ramis ſtirpatim concretum*; and that yet it is ſafely and proſperouſly uſed.

De Manna cap. 18.

I had communicated to me, as a rarity, a ſecret of the King of *Polands*, which is ſaid to do wonders in many Diſeaſes, and conſiſts onely in the uſe of the Liquor which drops about the beginning of the Spring, from the bar'd and wounded Roots of the Walnut-tree: but becauſe I have not yet made tryal of it my ſelf, I ſhall paſs on to obſerve to you, that in ſome Northern Countries, and even in ſome parts of *England*, bordering upon *Scotland*, the almoſt inſipid Liquor that weeps in *March*, or the beginning of *April*, out of the tranſverſly wounded Branches (not Trunks) of the Birch-tree, is wont to be uſed by Perſons of Quality as a preſervative from the Stone; againſt which cruel Diſeaſe, *Helmont* highly extols a Drink made of this Liquor and *ſemen dauci*, and *Beccabunga*, and I think not without cauſe. For not to mention all the commendations that have been given me of it by ſome that uſe it, I have ſeen *ſuch* ſtrange relief, frequently given among others, to a Kinſman of mine, to whom hardly any other Remedy (though he tryed a ſcarce imaginable variety) was able to give eaſe (and in whoſe diſſected Bladder, after another Diſeaſe had kill'd him, a Stone of many Ounces was found) *that* I uſually every Spring take care to provide a quantity of this Water, with which alone, without the other Ingredients mentioned by *Helmont*, my Kinſman uſed to be relieved as long as he could keep it, which you may do the longer, by pouring upon the top of

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it a quantity of Sallet Oyl, to defend it from the Air; and perhaps also by Distillation: By which (last named) way, I know an Ingenious Man that is wont to preserve it for his own use, and says, he findes it not thereby impair'd in virtue. But the most effectual way that ever I yet practiced, *Pyrophilus*, to preserve both this and other Liquors and Juices, is dexterously and *sufficiently* to impregnate them with Fume of *Sulphur*, which must be at divers, and *often* times as it were, incorporated with the Liquor by due agitation; the manual Operation belonging to this Experiment, I may hereafter have occasion to describe more fully, together with the particular Effects of it in several Bodies. And therefore it may here suffice to tell you, that if you practice it carefully, you will, perhaps, think your self oblig'd to thank me for the discovery of it, though a heedful Reader may finde it, not obscurely, hinted in *Helmont*'s Writings.

I might here annex the great commendation which I have found given to this Birch-water, by eminent Writers, against the hot distempers of the Liver, and divers other affections; and especially how *Freitagius* commends it very much to dilute Wine with: and adds, *Hæc est dulcacida & grati saporis, sitim sedat viscerum & sanguinis fervorem temperat, obstructiones reserat, calculum pellit.*

In consilio Medicinali in catarrho calido pro Principi quodam.

But I suppose you will think it high time for me to proceed to another subject; and indeed I should not have spent so much time in discourfing of Drinks, but that I am apt to think, that if there were greater variety of them made, and if they were more skilfully ordered, they might, by refreshing the Spirits, and insensibly altering the mass of Blood, prevent and cure (without weakning or much troubling the Patient) almost as many Diseases as the use of our common, unwholesome, and sophisticated Wines is wont to produce.

For

For in Fermentation, the Sulphurous (as Chymists call them) the Active, and the Spirituous parts of Vegetables, are much better loosened, and more intirely separated from the grosser and clogging parts, in most Mixts, then they are by the vulgar ways of Distillation, wherein the Concrete is not open'd by previous Fermentation. And these nobler parts being incorporated with our Aliments, are with them received freely, and without resistance carryed into the mass of the Blood, and therewith, by circulation, conveyed to the whole Body where their Operation is requisite. And I remember, that discoursing one day with an eminently learned and experienced Physitian, of the Antinephritical virtue of our common wilde Carret-seed, fermented in small Ale; he smilingly told me, that he found its efficacy but too great: For having prescrib'd it to some of his rich Patients, who were wont frequently to have recourse to him in their Nephritical distempers, after the use of this drink for a pretty while, he seldom heard of them any more. And for your encouragement, *Pyrophilus*, to make tryals of this nature, we will adde, That though the Seed it self be not over-well tasted, yet being fermented in a due proportion with the Liquor (we used an Ounce and half of the Seed, to a Gallon of the Ale) the Drink compos'd of both tasted pleasantly, almost like Lemmon beer.

And that you may the less wonder at the efficacy of fermented Liquors, it is worth considering, what virtue is ascribed to the bare decoction of that Herb, which the *French* and we call *Thé*, or *Té*, which is much magnified here; and as far as my little experience in my self, and others (of which more hereafter) reaches, not altogether without cause: But among the *Chineses* and the *Japonians*, it is the common Drink of Persons of Quality, by whom it is so highly prais'd, that

that the experienced *Tulpius*, in the new Edition of his Observations, tells us, That one pound of the Japonical *T'chia* (as the Natives call it) is not unfrequently sold for one hundred pounds of Silver; which is not to be wondred at, if they justly ascribe to it, that in those Countrys Men are not subject to the Stone, or the Gout, and if but one half of the Virtues he there attributes to it, be for the most part to be found in it. *Obs: Lib. 4. Cap. ultimo.*

I might, when I told you of the variety of Materials not used among us, have added one strange Drink, which a Chyrurgion, that a while since lived at in the *East Indies*, told me, he saw much used thereabouts: They make it of the raw Flesh of Goats, Capons, and the like, which, together with Rice and *Molosses* (or black course Suger) they put into a quantity of Water, and distil it in an Alimbick till the Liquor be stronger then Brandy (as they call common weak Spirit of Wine or of Lees of Vinous Liquors) And this *Rack* (as the extravagant Liquor is call'd) is often drunk in hot weather, and found very comfortable: those that use it, prizing it much, as supposing it draws a nutritive and cherishing virtue from the Flesh; as indeed, if any quantity of the nobler parts of that, do concur to the constituting of the Liquor, it may probably be, at least to divers Bodies, very wholsome in that Country, where they finde strong Drinks necessary to recruit their Spirits, exhausted by the excessive heat of the Climate. As I remember, the experienced *Bontius*, in his *Medicina Indorum*, tells us, That the Merchants travelling through the scorching Deserts of *Arabia*, *Persia*, or *Turkey*, finde it best to quench their thirst by a draught of the Spirit of Wine, or else of the strongest *Persian* or *Spanish* Wine. *Dialogo 3.*

And of the great use, if not necessity of either Brandy,

or such other strong and Spirituous Drinks in the hot Climats of the *Indies*, divers intelligent Persons of our own Country, have, upon their own experience, sufficiently satisfied us.

Nor, *Pyrophilus*, is Natural Philosophy able onely to improve our Drinks, but the rest of our Aliments also: For not to mention, that Experience hath assur'd us, that by skilfully contriv'd Ovens (wherein the heat plays every way about the Bread, without yet suffering any of the smoke or steams of the Fire to come at it, and wherein what degree of heat you please may be continu'd from first to last) better Bread may be bak'd, then in our common Ovens, where the Bread rests upon the Harth, and the heat is continually decaying. Not to mention this, I say, Physiologie can inable us to confer a very grateful taste on very many of the things we eat, barely by a skilful and moderate untying and exciting the formerly clogg'd Spirits, and other sapid parts contain'd in them. It can teach us to make better Bread then is commonly eaten: And by discovering to us a better Art of Cookry, then *Apitius* and his Successors have left us, and by substituting innocently sapid things, instead of those unwholsome ones, their deliciousnes endears to Men; It can teach us to gratifie Mens Palates, without offending their healths: & in preserving of fresh Meats, Fruits, *&c.* beyond their wonted seasons of duration, the Naturalists skill may perform much more then you will readily believe.

And yet to incline you not to be too diffident in this particular, let me inform you, That much hath been already perform'd, as to the preservation of Aliments, even by those that have not troubled themselves to make Philosophical enquiries after the Causes and Remedies of Putrefaction in Bodies, but onely have been taught by obvious and daily Observations, that the Air doth much contribute to the corruption

of

of ſome Bodies, and the excluſion of Air to the hindring it. I remember, the inquiſitive and learned Mr. *Borreel*, aſſur'd me ſome while ſince, That he had in his Country, *Holland*, eaten Bisket that was yet good, after it had been carryed from *Amſterdam* to the *Eaſt Indies*, and brought back thence again (in which Voyage, between two and three Years are wont to be ſpent) And to confirm my conjecture of the way of preſerving this Bread ſo long: He told me, that the curious Merchant whoſe it was, uſed no other Art, then the ſtowing his Bisket, well baked, in Casks exactly calk'd; and beſides, carefully lin'd with Tin, for the more perfect excluſion of the Air. Adding, That to the ſame end the Biſkets were ſo placed, as to leave as little room as poſſibly might be in the Cask, which alſo was not opened, but in caſe of abſolute neceſſity, and then preſently and carefully cloſed again.

I may elſewhere tell you of an eminent Naturaliſt, a Friend of yours and mine, that hath a ſtrange way of preſerving Fruits, whereby even *Gooſ-berries* have been kept for many Moneths, without the addition of Sugar, Salt, or other tangible Bodies; but all that I dare yet tell you, is, That he aſſures me his Secret conſiſts in a new and artificial way of keeping them from the Air.

But it ſeems more difficult, as well as more uſeful, to be able to preſerve Meat long without Salt; for 'tis ſufficiently known to Navigators, how frequently, in long Voyages, the Scurvy, and other Diſeaſes, are contracted by the want of freſh Meat, and the neceſſity of feeding conſtantly upon none but ſtrongly poudred Fleſh, or ſalted Fiſh; and therefore, he is much to be commended that hath firſt deviſed the way to keep Fleſh ſweet, without the help of thoſe fretting Salts Men are wont to uſe to make it keep. This way is not un-

known to some ingenious Persons in *London*: One of the most noted of whom, upon my conjecturing how it may be perform'd, confess'd to me, that I had hit upon the way in general: But the most satisfactory account I could get of it, was from an English Man, that lately practised Physick in the *East Indies*, who, finding I was no stranger to what I asked him about, told me freely, that he had seen both Goats-flesh, and Hens, so well preserved by this way, that though it were put up in the *East Indies* awhile before he came thence, yet he eat of it, and found it good and wholsome, between the Islands of *Cape Verd* (as the Sea-men call them) and *England*; so that this Meat continued sweet above six Moneths, notwithstanding the heat and closeness of the Ship, the excessive heat they met with in their Passage under the Line, and consequently through the Torrid Zone: and that the way was onely this, That the Meat being well roasted, and cut in pieces, was carefully and conveniently ranged in a very close Cask, into which, afterwards, there was poured as much Butter melted, skimmed, and decanted from the grosser and ranker Parts, as would fill up all the intervals left between the several pieces of Flesh, and swim about them all, and thereby keep out the Air from approaching them; and then the Cask, being exactly closed, was stow'd up in a convenient place in the Ship, and kept unopen'd till the Meat was to be eaten. And it must not be omitted, that the Relator, and others that had the care of making Provision for the Voyage, were fain, instead of Butter made of Cows Milk (which could not be had where they took in their Lading) to make use of that made of Goats, or Ews Milk, which is not (as the *Indians* make it) so good, and to whose rankness he ascribed that which he had observed in some of the Meat buried in it, which he thought might have been preserved *longer*,

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and *better tasted* (for *wholsome* and *incorrupt* he said it was) in our *European* Butter, whose power to preserve Meat bury'd in it, after due Coction, hath been confirmed to me upon their own observat on, by an experienc'd Officer of the English Fleet, that had the over-sight of the Provisions, and by others that had opportunity to observe it.

But how much the Naturalists skill may advance the Dietetical part of Physick, by enabling Men to make Aliments much lastinger then naturally they are, I must not here labor to convince you by other instances, that I may not anticipate what we have elsewhere to acquaint you with, from other Mens Experiments, and our own, about the conservation of Bodies. Onely I shall at present tell you in general, That I hope there will be ways found out to preserve even raw Flesh it self (for of the keeping of roasted, we have just now given you an instance) with things that do not so much fret it, nor give it so corrosive a quality, when eaten, as our common Salt doth. For not to mention what several curious Persons have practised, of salting Neats Tongues with Saltpeter, which though done onely to make them look red, shews that a Body, not corrosive like common Salt, may preserve Flesh: I have, for tryal sake, kept an entire Puppy of pretty bigness, untainted for many Weeks (and that in the midst of Summer) and that without flaying, drying (by Fire or otherwise) or so much as exenterating him, or cleansing him, or doing any thing towards the preserving of him, save the keeping him immersed in a well stopt Vessel, under Spirit of Wine (from whose taste, I presume, Meat may be easily freed by Water) and there seemed small cause to doubt, that the onely thing that hindred me from keeping him much longer, was the want of time to pursue the Experiment, and take notice of its success: For I remember, I have the same

way

way kept a ſoft Subſtance, taken raw from an Ox or Cow, for many Moneths (if I miſtake not, eighteen or twenty) and found no putrefaction or ill ſent in the immerſed ſubſtance, which, for ought I know, might have been preſerved divers Years together the ſame way, or at leaſt, by an eaſie improvement of this method, of which, as I lately intimated, I intend you hereafter an account.

And I ſhall further adde on this occaſion, That if we reflect upon *Suger*, which is (at leaſt in theſe Weſtern Regions) but an almoſt recent diſcovery, and conſider how many Bodies are with it, by Confectioners and others, not onely preſerv'd, but rendred exceeding grateful to the taſte; that ſingle inſtance may ſuffice to make us think it probable, that expedients yet unthought of, may, by an inſight into Nature, be found out, for the preſervation of Bodies; eſpecially, if our ingenious Friend, Mr. *W.* would ſhew us, how out of divers other Concreats, beſides the Suger Cane, a Subſtance not unlike Suger (though of different taſte, according to the nature of the Vegetable that affords it) may, by a peculiar induſtry, be prepar'd: which, that you may not think unfeazable, let me mention to you (for perhaps he hath not yet taken notice of it) what even *Indians* have done of this nature. And firſt, let me inform you of what we are told by *Linſchoten* * concerning that Drink, which in the *Eaſt Indies*. they call *Sura*, and made of the Liquor dropping from the Bloſſoms, that they cut away from the *Indian* Palm Tree which bears the *Coco* Nut. For of this *Sura*, he tells us, That amongſt other things, they make Suger (which is called *Jagra*) which is made

* *Linſcotens* Voyages, chap. 56.—— When they deſire to have no *Cocus*, or Fruit thereof (namely of the Palm-trees) they cut the Bloſſoms of the *Cocus* away, and binde a round Pot, with a narrow mouth (by them called *Calao*) faſt to the Tree, and then ſtop the ſame cloſe, round about with Pot earth, ſo that neither Wind nor Air can enter in, or come forth; and in that ſort, the Pot, in ſhort ſpace, is full of Water, which they call *Sura*; and is very pleaſant Drink, like ſweet Whey, and ſomewhat better.

made by boiling that Liquor, and ſetting it in the Sun, where it congeals to Suger.

And though I muſt not conceal from you, that our Author adds, that it is not much eſteemed by reaſon of its brown colour, and for that (to uſe his words) they have ſo great quantity and abundance of white Suger throughout all *India*, yet the latter reaſon, of the cheapneſs of *Jagra*, ſeems to be the principal. For probably, if other Suger were ſcarce, the melioration of this would be attempted; and 'tis very likely, That if a skilful Naturaliſt had the ordering of that ſweet Juice, of which the *Indians* make their *Jagra*, he might very well make of it a Suger of no ſmall uſe; and ſuch a Suger would be very convenient in many caſes, and to many Perſons, for its being different from the common Suger, though it ſhould not be better. *Garcillaſſus* alſo (a much applauded Writer concerning the *Weſt Indies*) treating of the Fruits of a *Peruvian* Tree, call'd by ſome *Molle*, and by others *Mulli* *conficiunt* (ſaith he) *ex eo potum confricando blande inter manus in aquâ calidâ donec dulcor omnis defricetur: Percolant hanc aquam ſeruantque dies tres quatuorve donec ſubſideat. potus eſt limpidiſsimus*, &c. *Aqua eadem cocta convertitur in optimum mel*: And of the ſame Plant, *Petrus de Cieca* hath this confirming Paſſage, *Ex hujus fructu cum aquâ decocto, pro coctura modo, fit aut vinum ſive potio admodum bona aut acetum aut mel.* And that there is a great affinity betwixt ſuch Vegetable Hony's and Suger, eſpecially if the Juices be ordered with a deſign of turning them rather into Suger then Honey, you may eaſily gather from the next and more memorable inſtance which we are to mention, and which is afforded us by the diligent Deſcriber of the *Braſilian* Plants, who treating of the *Caraguata*, or *Erva Baboſa* (or as ſome would have it, *Herba innominata caule portulacæ*) hath theſe words

Apud Joh. de Laet. deſcrip. Indiæ, l. 10. c. 3.

Apud eundem eodem loco.

words to our preſent purpoſe: *Porro* (ſaith he) *radendo novacula petroſâ ſtolones, emanat ex concavitate liquor quidam tantâ copiâ ut ex unâ ſolummodo plantâ* (*Mirabile dictu*) *interdum* 50. *aut plures arobæ effluant è quo liquore fit vinum, acetum, mel & ſaccharum: liquor quippe per ſe dulcis coquendo redditur multo ſuavior & ſpiſsior, ita ut tandem in ſaccharum congelaſcat.*

Since the writing of theſe laſt Lines, being viſited by an ancient *Virtuoſo*, Governor to a conſiderable Colony in the Northern *America*, and inquiring of him, among other particularities touching his Country, ſomething in relation to the thoughts I had about the making of ſeveral kindes of Suger, he aſſur'd me, upon his own experience, that there is in ſome parts of *New England*, a kinde of Tree, ſo like our Wallnut-trees, that it is there ſo called, whoſe Juice that weeps out of its Inciſions, *&c.* if it be permitted ſlowly to exhale away the ſuperfluous moiſture, doth congeal into a ſweet and ſaccharine ſubſtance; and the like was confirmed to me, upon his own knowledge, by the Agent of the great and populous Colony of the *Maſathuſets*. And very lately demanding of a very eminent and skilful Planter, why, living in a part of *America*, too cold to bare Sugar-Canes, he did not try to make Sugar of that very ſweet Liquor, which the Stalks of *Maiz*, by many called *Indian* Wheat, affords, when their Juice is expreſſed; he promiſed me he would make tryal of it: Adding, That he ſhould do it very hopefully, becauſe that though he had never been ſolicitous to bring this Juice into a ſaccharine form, yet having ſeveral times, for tryal ſake, boild it up to Syrup, and employed it to ſweeten Tarts, and other things, the Gueſts could not perceive that they were otherwiſe ſweetned then with Sugar. And he farther

farther added, That both he and others, had, in *New England*, made such a Syrrup with the Juice of Water Melons.

Nor, *Pyrophilus*, is it onely by teaching Men to improve the wholesomness and tasts of the Aliments, or to keep them long uncorrupted, that the Naturalist may contribute to the preservation of Man's health: For from the ingenious attempts of *Sanctorius*, in his *Medicina Statica*, we may be invited to hope, that there may be ways, as yet unthought of, to investigate the wholesomness or insalubrity of Aliments; as he, by the weight of Bodies, after having fed on such and such Meats, findes that Swines Flesh, Melons, and some other things that he names (in the third Section) do much hinder insensible Perspiration, and consequently are unwholsome; though, as I take it, it were not amiss, that before such Observations be fram'd into general and establish'd Aphorisms, they were carefully made in Bodies of differing Ages, Sexes and Complexions, and with variety of Circumstances: But then again, presuming these Maximes to be judiciously fram'd, the same *Statica Medicina* makes it hopeful, that there may be unthought-of Methods found, whereby, by ways different from those formerly used by Physitians, a Man may be much assisted in the whole manner of ordering himself, so as to preserve health, and to foresee and prevent the approach of many Distempers. And perhaps by such unthought-of ways, divers Paradoxes of concernment to Mans health may be made out, as the diligent *Sanctorius* to that Observation proposed in these words *Semel aut bis in mense facto excessu in cibo & potu, die sequenti, licet sensibiliter non evacuet, minus solito perpendit annexus* (in the following Aphorism) addeth this important Corollary: *Victus uniformis caret beneficio illorum qui semel vel bis in mense ex-*

Sect. 3. Aphorism 96.

cedunt: expultrix enim à copia irritata excitat tantum perspiratus, quantum sine statica nemo crederet. And indeed, experience hath informed us, that the promoting or suppressing of insensible transpiration, by which, in a day, the Body may discharge it self of four or five pound of excrementitious Matter, hath a much greater power to advantage or prejudice health, then is wont to be taken notice of; so that we see that the Staticks, which, though long known, were thought useless to Physick, may afford several important directions in reference to the preservation of Mans health; to which there are likewise other ways whereby the Naturalist may contribute. For he may also devise means, whereby to judge of the qualities of Aliments, especially Drinks in their respective kindes; and likewise of the temperature of the Air in this or that place assign'd, we shall, in one of the following Essays, describe to you a small slight Instrument, by the help of which, one that is acquainted with this or that particular sort of Wine, may give a near guess whether it be embased with Water or not. And whereas in most hot Countrys, where Water being the common Drink, 'tis of great concernments to Mans health to be able to make a good estimate of the salubrity of it; And whereas Physitians are wont to think Water *cæteris paribus*, the better and purer the lighter it is, this Instrument presently manifests, without any trouble of weighing in Scales, what among any Waters propos'd is the heaviest, and which the lightest, and what difference there is of gravity betwixt them: And this disparity may sometimes be so great, that I remember some of our English Navigators tell us, That upon bringing home a sort of Water out of *Africa* into *England*, they found, by the common way of ponderation, the *African* Water in the same bulk, to be about four Ounces in the pound lighter then

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the *Engliſh*. And as the thickneſs or lightneſs of Waters may be thus preſently diſcerned by this *Hydroſtatical* way, ſo 'tis poſſible, by ſome Chymical Experiments, eaſily enough to diſcover ſome other qualities, wherein Waters, that are thought to be of the ſame nature, differ from each other; as we finde that very many Pump-waters will not bear Soap, as Rain-waters, and the generality of Spring-waters will do: ſome Water will not well dye Scarlet, or ſome other particular colour, becauſe they are ſecretly imbued with ſome kinde of ſaline Subſtance, that hath an operation it ſhould not have upon the Ingredients imployed by the Dyer. And I have ſometimes diſcovered a latent Sea-ſalt in Water, where others ſuſpected no ſuch matter, by pouring into it a ſolution of good Silver, made in *Aqua fortis*: For as common Salt, as well as the Spirit of it, will precipitate the Metal out of ſuch a ſolution, in the form of a white Calx; ſo it ſeem'd rational to conceive, that in caſe the Water I ſuſpected had been imbued in its paſſage through the Earth with a ſaline quality, though not conſpicuous enough to be taken notice of by the taſte; theſe ſaline Corpuſcles diffuſed through the Water, would, though faintly, act their parts upon the diſſolved Silver, and accordingly I found, that upon the mixtures of ſuch Waters, and the Metalline ſolution, there would immediately be produced a kinde of whiteneſs (from ſome parts of the Metal precipitated by the Salt:) to avoid which, I have often been fain to uſe, in places where I met with ſuch Waters, either Rain-water, or that which is freed from its common Salt, by a ſlow Diſtillation.

And as for the temperature of the Air, which is acknowledged to be of exceeding great conſequence, both as to health, and as to the prolongation of life; and which is poſſibly yet of greater moment to both then moſt Men imagine,

the skilful Naturalists sagacity, if it were employed to that purpose, might probably finde divers ways of discovering the qualities, and consequently the salubrity and unhealthfulness of the Air in particular places. For the diligent *Sanctorius* (in the second Section of his *Medicina Statica*) teacheth us how to estimate the healthfulness and insalubrity of the Air, by the weight of those Mens Bodies that live in it. And besides this (nice) way, we see, that by the late Invention of Weather-Glasses, 'tis easie to discern which of two Neighboring Houses, and which of two rooms in the same House is the colder. And I remember, I have sometimes bethought my self of a slight way (to be mention'd in one of the following Essays) by the help of which, it is not hard to determine in which of two places proposed, the Air is *cæteris paribus*, the dryer or the moister; And to give also some gues, both how much at the same time the Air of one place exceeds that of the other, and how the temperature of the Air changeth in the same place at several times, either of those qualities. And that the differing operations of several Airs, upon certain sorts of Flesh hung in them, upon some fading colours, upon Bodies subject to gather rust, or to be tarnish'd; and in a word, upon divers other subjects, may be more considerable then Men seem yet to have taken notice of, I shall think it sufficient to have intimated in this place, being desirous to hasten to the following Essay (wherewith I am to conclude, what I have to offer to you concerning Physick) that I may have the more time to employ on it.

ESSAY

ESSAY V.

Proposing some Particulars wherein Natutural Philosophy may be useful to the Therapeutical part of Physick.

AND now, *Pyrophilus*, the method that we formerly prescrib'd to our selves (a little after the beginning of the first Essay) requires, that we consider awhile the *Therapeutical* part of Physick, which is indeed that, whose improvement would be the most beneficial to Mankinde; and therefore I cannot here forbear to wish, That divers Learned Physitians were more concern'd, then they seem to be, to advance the Curative part of their Profession; without which, three at least of the four others may prove indeed *delightful* and *beneficial* to the Physitian, but will be of very little use to the Patient, whose *relief* is yet the principal end of Physick: whereunto the *Physiological*, *Pathological*, and *Semiotical* parts of that Art ought to be referred. There was, awhile since, a witty Doctor, who being asked by an Acquaintance of mine (himself an eminent Physitian, and who related this unto me) why he would not give such a Patient more *Generous Remedies*, seeing he grew so much worse under the use of those *common Languid ones*, to which he had been confin'd, that he could not at the last but dye with them

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in his Mouth? briskly answered, *Let him die if he will, so he die secundum artem.* I hope there are very few of this Man's temper, but it were to be wished, that there were fewer Learned Men that think a Physitian hath done enough, when he hath learnedly discoursed of the seat and nature of the Disease, foretold the event of it, and methodically imployed a company of safe, but languid Remedies, which he had often before found almost as unable to *cure* the Patient, as unlikely to *kill* him. For by such an unprofitable way of proceeding, to which some lazy or opinionated Practizers of Physick (I say *some*, for I mean not *all*) have, under pretence of its being safe, confined themselves; they have rendred their whole Profession too obnoxious to the Cavils of such Empericks, as he that (as the Lord *Verulam* reports) was wont to say, Your *European* Physitians are indeed Learned Men, but they know not the particular Cures of Diseases; and (unreverendly enough) to compare our Physitians to Bishops, who had the Keys of *binding and loosing*, and nothing else: Which brings into my minde, what Monsieur *De Balsac* relates (in his witty French Discourse *of the Court*) of a Physitian of *Millain*, that he knew at *Padua*, who being content with a Possession of his Science, and (as he said) *The enjoyment of the Truth*, did not onely not particularly enquire into the Cure of Diseases, but boasted, That he had kill'd a Man with the faireſt Method in the World: *E morto* (said he) *canonicamente, è con tutti gli ordini.* And such Scoffs and Stories are readily enough entertain'd by the major part of Men, who send for Physitians, not so much to know what ails them, as to be eas'd of it; and had not rather been methodically kill'd, then Empirically cured. And it doth indeed a little lessen even my esteem of the great *Hippocrates*'s skill, to finde mentioned in his Writings so many of his Patients,

tients, of whom he concludes, that they dyed: And I had much rather, that the Physitian of any Friend of mine, should keep his Patient by powerful Medicines from dying, then tell me punctually when he shall die, or shew me in the opened Carcase why it may be supposed he lived no longer. But, *Pyrophilus*, my concern for Mankinde, and for the reputation of many excellent Physitians, whose Profession suffers much by the want of either Industry or Charity, in such as we have been speaking of, hath diverted me longer then I thought, from telling you, That I suppose it will not be very difficult to perswade you, that this so useful *Therapeutical* part of Physick is also capable of being much improved by a knowing Naturalist, especially if he be an intelligent and expert Chymist, as in this Essay we will suppose him.

CHAP. I.

SOme *Paracelsian* would, perhaps, set forth, how much more easie to be taken Chymically prepared Medicines are wont to be, then those loathsome and clogging *Galenical* Potions *Bolus*'s, *&c.* which are not onely odious to the Takers, but (which is much worse) are to many so offensive, that either the Patients cannot get them down, or the incensed Stomack returns them, by Vomit, before they have stayed long enough in the Body to do any more then distemper it. But I shall not much insist on this, because I think wholesomness to be much more considerable in a Remedy then pleasantness: though, I confess, I could wish that Physitians were more careful to keep Patients from being almost as much troubled by Physick, as by the Disease, and to cure according to the old Prescription, not onely *citò* and *tutò*, but *jucundè* too:

Especially

Especially considering that, as we were saying, the loathsomness of some Medicines maketh the Stomack reject them, before they can have performed their Operations. And it is, I presume, on this account as much as on any other, that at *Oxford* Learned & Practical Physitians, of your Acquaintance, make very frequent use (on Patients not Feverish) of the *resin* of *Jalap*, barely drawn with Spirit of Wine; since as we have tryed six, eight or ten, or more Grains, of this almost insipid Resin, being cleanly prepared, according to Art, and with a little *Gum-tragacanth*, and half its weight of powdred Cinamon, or some such thing, made up, may be taken in the Morning, in form of Pills, instead of a Potion; and is wont to evacuate plentifully enough, and yet gripe the Patient much less then common Purges. But, as I said, I shall not insist on this. I might better commend the usefulness of Chymistry to the *Therapeutical* part of Physick, from hence, That it is probable, that even emptying Medicines may, by the *Spagyrists* Art, be so prepared, as not onely to be less offensive then common Purges or Vomits in the taking, but to be less painful in the working: As I have often observed, both in my self and others, that upon the taking of the clear, and not loathsome Mineral *Waters of Barnet*, though the Medicine wrought with me ten or twelve times in a Morning, yet it did not either pain me, or make me sick, or disorder me for the remaining part of the day, any thing near so much as a common Pill or Potion that had wrought but once or twice would have done. And I shall elsewhere (God permitting) teach you a preparation of Silver, whereof about three or four Grains being made up (with any proper Conserve) into a little Pill, is wont to make a copious evacuation of *Serum* especially (in Bodies that abound with it) without making the Patient almost at all sick, or griping him: Insomuch that

I know

I know some Persons, both Physitians and others, with whom though this Medicine work frequently in a day, and though (which is stranger) once taking of it will with some Persons work so for two or three, or more days successively, yet they scruple not to go abroad and follow their business; and some that take it, tell me, That when it works not with them (as for the most part, when it hath freed the Body from superfluous *Serum*, it will cease, and in some Bodies will scarce purge at all, it neither puts them to pain, nor makes them sick.)

And now I am speaking of the painless ways of relieving the sick, I shall adde, That there is another way, whereby 'tis to be hop'd, many Patients may be rescued from a great deal of pain, and that is by finding out Medicaments, that may in several Distempers, that are thought to belong peculiarly to the Chirurgions hand, excuse the need of Burning, Cutting, Trepaning, and other as well painful as terrible manual Operations of Chirurgery. *Helmont* tells us, That he knew a Country Fellow, who cur'd all fresh Wounds by a Drink made (as I remember) of burnt *Tilia*. I have inform'd you in another Essay, of the Cure I observed to be made of the exulcerated *Tumors* of one sick of the *Kings Evil*, by the use of Beer, altered by a little Plant, that did not at all disturb the Taker. If we may believe, *Helmont's* and *Paracelsus's Præcipitatus Diaphoreticus*, taken at the Mouth, doth cure, to use his own Words, *Carcinoma, Lupum & quodlibet Æsthiomenum cacoethes ulcus, sive externum sive internum.* And if there be any truth in what hath been affirm'd to me by several Eye-witnesses, as well Physitians as others, concerning the *Weapon Salve*, and *Powder of Sympathy*, we may well conclude, That Nature may perform divers Cures, for which the help of Chirur-

Helmont, De Fœbribus, c. 14. See also the same Author in *Tractat: quem vocat Arcana. Paracels: & Lib. de Febr. Cap.* 14.

gery is wont to be implor'd, with much leſs pain to the Patient, then the Chirurgion is wont to put him to. I know a very ingenious Man, that is Famous as well for his Writings as for a Remedy, wherewith he undertaketh to cure conſtantly the exulcerated Cancers of Womens Breaſts, without any conſiderable pain: But having not yet had opportunity to make tryal of that which I have lying by me, I ſhall onely tell you, he aſſures me, That his Medicine is indolent, and mortifies the ulcerous parts as far as they are corrupted, without diſordering the Party troubled with them; which I the leſs doubt, becauſe, that (to adde thus much on this occaſion) partly by the colour, *&c.* of his Powder, and partly by his own confeſſion to me, it ſeems to be a dulcification of *Arſenick*, firſt fixt with *Nitre*, and then carefully freed from its corroſiveneſs, by very frequent Diſtillations of freſh Spirit of Wine. I ſhall ere long have occaſion to teach you a Drink, whereby exulcerated (but not Cancerous) Breaſts have been very happily cured. The learned *Bartholinus*, in his late Obſervations) mentions the cure of ſome hurts in the Head, done without Trepaning, in caſes where that formidable and tedious Operation is wont to be thought neceſſary. As for the terrible way of ſtopping the violent Bleeding in great Wounds, by ſeering the Orifices of the Veſſels with hot Irons, it would be little needed, if we knew ſuch Remedies as that which the Inquiſitive *Petrus de Oſma*, in his curious Letter to *Monardes* from *Peru*, mentions in this Paſſage, which I finde among his other Obſervations: *Anno* (ſaith he) 1558. *in urbe D. Jacobi quæ eſt in Provincia Chyle, quidam Indi captivi ſuras ſibi amputarunt, & eas aſſas præ fame ederunt & (quod mirabile dictu) cujuſdam Plantæ folia vulneribus imponentes, ilicò ſanguinem ſiſtebant.* I knew a rich Man, extreamly corpulent, who having long had a ſtrange

Apud Monard: de ſimplic: Medic. pag. 34.

kinde

kinde of *Fistula* in his Breast, and having travelled from one Country to another, to consult with the ablest Chirurgions, was at length brought to that pass, that at a Consult they resolved, by opening his Breast, to try if they could track the winding *Fistula*, and save his Life: And as the Instruments, for this sad operation, lay upon the Table, another famous Chirurgion casually coming into the House, told the Patient that he had an art of curing *Fistula*'s without cutting them open, and without any considerable pain or trouble: Whereupon the rich Man offering him what he pleased for the Cure, the Chirurgion quickly perform'd his Promise, as the Patient himself, who shew'd me his Breast, confess'd to me, and that by the use of an almost indolent Remedy, which he purchas'd of the Chirurgion, and which by his favor came to my hands: And that even very ill-condition'd *Fistula*'s may be cured without Chirurgical Operations, by Medicines taken at the Mouth, I shall ere long have occasion to shew you by a notable Example.

In the mean time I shall adde, That a Man, whom I suppose you have often seen, having a while since received such a kick of a Horse, as made the Doctor and Chirurgion that tended him, to conclude the part gangrenated, and the Patients condition, by the accession of a violent Feaver, so desperate, that they desired to meddle with him no longer; a large Dosis of Sir *Walter Rawleigh*'s Cordial, sent him by an excellent Lady you are nearly related to, not onely freed him from his Feaver, and the *Delirium* that attended it, but, to the wonder of all that observed it, restored the Limb that was concluded gangrenated to its former soundness.

And to bring credit to all these Relations, I shall crown them with that memorable Passage of *Gulielmus Piso*, of as great things that he saw done by the illiterate *Indians* themselves:

ſelves: *Memini* (ſaith he) *in caſtris membra militum globulis ſclopetorum icta, & jamjam ab Europæis Chirurgis, tam Luſitanis quam Batavis, amputanda, barbaros recentibus gummi ſuccis & balſamis à ferro & igne liberaſſe & feliciter reſtituiſſe. Oculatus itidem teſtis ſum in Noſocomiis relicta ulcera & gangrenas ab illis vel ſolo ſucco Tabaci curata.*

But, *Pyrophilus*, That the making of divers Helps to Recovery leſs diſtateful, or leſs painful to the Patients, is not the *onely*, nor perhaps the *greateſt* ſervice that Chymiſtry may do him that attempts the Cure of Diſeaſes, I ſhall now indeavor to manifeſt in ſome Particulars.

CHAP. II.

AND *firſt*, The skilful Naturaliſt, eſpecially if a good Chymiſt, may much aſſiſt the Phyſitian to diſcover the Qualities of Medicines, whether *ſimple* or *compound*; That the Experiments of the Spagyriſts may much contribute to the examining thoſe many things themſelves prepare, you will, I preſume, eaſily grant: That alſo divers Mineral Waters are of the nobler ſort of Medicines, is ſufficiently confeſſed on all hands; and 'tis known too, that the Induſtry of Chymiſts hath produced ſome good directions towards the diſcovery of the Minerals predominant in divers Medicinal Springs: But I am much miſtaken, if they have not left much for others to do, which may be eaſily done. And I ſcarce doubt, but that by the various ways that might be propoſ'd, of trying what ſuch Waters hold, and what ſaline or other Qualities are predominant in them, not onely the nature of thoſe Medicinal Waters that are already uſed, might be more throughly underſtood; but undetected Properties, might in many other s that are now not taken notice of, be diſcovered;

of

of some of which ways of examining Mineral Waters, I may elsewhere give you an intimation. And I have made several tryals that have, I confess, much inclin'd me to think, that the fault is rather in us, then either in Nature or Chymistry, that Men do not, by the help of Chymical Experiments, discover more of the nature of divers Medicaments, then hitherto they seem to have so much as aim'd at: For though the abstruse Endowments of Specificks will not, I fear, be learn'd in haste, otherwise then by particular Tryals and Observations; yet many Simples have other Qualities, which seem chiefly to reside, though not in an Elementary Salt or Sulphur, yet in a part of the Matter that seems of kin to a Salt or Sulphur: such as sowerness, saltness, a caustick or a healing faculty, abstersiveness, and the like, upon whose account such Remedies seem chiefly to work in a multitude of cases. And towards the Investigation of such Qualities, a Chymist may oftentimes do much, without making all his Tryals in humane Bodies. But though, to illustrate this matter, I have sometimes made several Experiments, yet not having now my Notes and Observations at hand, I shall onely mention a few things as they offer themselves to my memory, reserving the more distinct handling of this subject to another opportunity: And the rather, because that till such *Phænomena* have been more diligently observ'd, and reduc'd to their distinct sorts, I would have them look'd upon but as hints to further Enquiries, not as sufficient Authority to ground general Rules on.

There are some Plants, whose Juices, especially when the superfluous moisture is exhal'd or abstracted, will, some by the assistance of a gentle Heat and Filtration, and some, even of themselves, in time (which I remember hath in some succulent Plants amounted but to a very few hours) coagulate in

in part into a kinde of Salt, which, if you pleaſe, you may call Eſſential: And by this *Nitro-Tartareous* Salt (as it ſeems to be) thoſe Vegetables, whoſe Juice affords it (ſuch as are, if I miſtake not their names, *Parietaria*, *Borrage*, *Bugloſs*, *&c.*) may be diſcriminated from thoſe many others, from whence it is not (at leaſt by the ſame way) to be obtain'd. And poſſibly alſo theſe Salts may, to a heedful Surveyor of them, appear to differ enough from each other in ſhape, taſte, or other obvious Qualities, to deſerve to be ſorted into differing kinds.

If likewiſe we compare the Eſſential Salts and Spirits of theſe Plants, with thoſe of *Scurvy-graſs*, *Brook-lime*, and other Vegetables that are counted *Antiſcorbutical*, and abound in Volatile and Saline parts: And if we alſo examine other Plants, by divers Chymical Operations, and obſerve not onely their diſpoſedneſs or indiſpoſition to yield Spirits or Oyls by Fermentation, or without it; but thoſe other Particulars wherein they will appear to agree with, or differ from each other: there is little doubt but ſuch Tryals will make them diſcover, to a conſidering Naturaliſt, much of their Nature and Properties, and eſpecially of ſuch as depend chiefly upon the plenty or paucity of the ſaline, unctuous, ſowre, ſpirituous, lazy, tenacious or volatile Parts.

It may be alſo obſerv'd, that the Infuſion or Decoction of ſome Plants, as of *Brazil*, *Senna*, *&c.* will be heighten'd into a rediſh colour, by putting *Alkalizate* Salts, as of *Tartar*, or of Pot-aſhes, in the Water that extracts their Tinctures: Whereas acid Spirits, at leaſt ſome of them, will much impair, if not deſtroy their colour; as a little *Aqua fortis* will immediately turn a red Tincture of *Brazil*, made in fair Water, into a pale yellow: Whereas on the other ſide, I have obſerv'd, that a ſmall quantity of a ſtrong Solution of Pot-

aſhes,

aſhes, drop'd into an Infuſion of red Roſe-leaves, hath preſently turn'd it into a muddy colour, that ſeem'd to partake of green and blew, but was dark and dirty; whereas a little *Aqua fortis*, or good Spirit of Salt pour'd into the ſame ſimple Solution, did immediately turn it into a fine red, and ſo it would do to the muddy Mixture lately mention'd, if it were put to it in a far greater quantity. I obſerv'd alſo, that with a very ſtrong (though clear and well filtrated) *Lixivium* of Pot-aſhes, I could precipitate ſome parts of the Infuſion or Decoction of red Roſes, which groſſer parts, when the Mixture was filtrated through Cap-paper, remain'd like a dirty colour'd (though ſomewhat greeniſh) Mud in the Filtre; the fluid and finer part of the Mixture paſſing through, in the form of a Liquor high coloured, almoſt like *Muſcadine*.

And on this occaſion, I remember, that as Galls, a very ſtiptick Vegetable excreſcence, will yield a Decoction, with which, and *Copperis*, the common Ink is made; ſo divers other Plants, of notably aſtringent parts, may be employed to the like uſe: For, by caſting *Vitriol* into a Decoction either of Oaken Bark, or red Roſes, or even a bare Infuſion of either Log-wood, or *Sumach*, to name now no other Plants of the like nature, I have preſently made a Mixture that might make a ſhift to ſerve for Writing Ink; but whether all ſtiptick Plants, or they onely, will with *Vitriol* make an Ink, I refer to further Enquiry: And as a Solution of *Vitriol*, and the Decoction of the above-mention'd Plants, do precipitate each other to make Ink; ſo I remember I have try'd, that by diſſolving the Cryſtals of pure Silver (made the common way with *Aqua fortis*, or Spirit of *Nitre*) in a good quantity of fair Water, that the Liquor having no colour of its own, the colours it produceth in other Bodies may be the better obſerv'd, I found that I could with this Liquor precipitate out

of

of the Infusions alone of several Vegetables, Substances differingly colour'd, according to their respective dispositions: And so I have found, with less cost, that *Saccharum Saturni*, which seems to be a kinde of *Vitriol* of Lead, whilst it lyes dissolved in the same Spirit of Vinager which extracted it from the Metal, being put to the bare Infusion of Log-wood, *Lignum Nephriticum*, red Roses (to name those I now remember I made tryal of) they will precipitate each other.

I might farther adde, That I have try'd that sulphureous Salts, such as Oyl of *Tartar*, made *per Deliquium*, being drop'd into the expressed Juices of divers Vegetables, will, in a moment, turn them into a lovely Green, though the Vegetables were of colours differing from that, and from one another (as I remember one of those Vegetables, in which I expected, and found that change, was of a fine Carnation) And I could tell you, that though it be disputed whether Quick-lime have any Salt dissoluble in Water, and of what sort it is, the *Examen* of that Question may be much furthered, by trying, as I have done, that the Water of Quick-Lime, well made, will precipitate a Solution of sublimate made in fair Water, and will presently turn Syrup of Violets (which is Blew) if well mix'd with it, into a fair Green. Experiments I say of this nature I might easily annex, but having already set down divers of them in what I have written concerning colours, I shall refer you thither: And now onely adde this Observation, that the Investigation of divers Medical Qualities, even of Animal Substances, may be much assisted by the Naturalist, especially a Chymist; as we elsewhere have by the Distillation of the *Calculus humanus* shewn, how much it differs from the Stones that are found in the Earth. And if you take those hard Concretions, found at certain times in the Heads of Craw-Fishes, that are wont

to

to be call'd *Lapides Cancrorum*, and commit some of them to Distillation, and infuse some in Vinager, and others in old Rhenish-Wine, or strong White-Wine, you will probably discover some thing of peculiar in the nature of this Concrete, of which I may possibly elsewhere make further mention to you: And not onely so, but in some Animal Substances, you may, by fit Experiments, discover notable Changes to be made, and their Qualities to be much heighten'd, when the Eye scarce perceiveth any Change at all, as I have purposely observ'd, in keeping Urine in close Glasses, and a moderate heat for many Weeks: For at the end of that time, the Virtues that depend upon its volatile Salt will be so heighten'd, that whereas upon putting Spirit of Salt to fresh Urine, the two Liquors readily and quietly mix'd, droping the same Spirit upon digested Urine, there would presently ensue a Hissing and Ebullition, and the volatile and acid Salts would, after a while, concoagulate into a third Substance, somewhat of the nature of *Sal Armoniack*. And whereas the Syrup of Violets, formerly mention'd, being dissolv'd in a little fresh Urine, seem'd to be but diluted thereby; a few drops of the fermented Urine, temper'd with it, did presently turn it into a deep Green: And the same digested Urine being drop'd upon a Solution of Sublimate made in fair Water, presently turn'd it white, by precipitating the dissolved Mercury. With what (various) success we have likewise made upon some other parts of a humane Body, as well consistent as fluid, some Tryals, analogous to what we have recited of Urine, I may *elsewhere* perchance take notice to you: But of such kinde of Observations I must give you but this Hint at *present*.

CHAP. III.

Secondly: By these and other ways of investigating the Medicinal Qualities of Bodies, the Naturalist may be enabled to adde much to the *Materia Medica*: And that two several ways.

For, he may by his several ways of tryal, and by his Chymical preparations discover, that divers Bodies, especially of a Mineral nature, that are as yet not at all employed by Physitians, at least internally, may be brought into use by them; and that others that are naturally so dangerous, as to be us'd but in very few, and for the most part extream cases, may with safety be more freely employ'd. Some Modern Chymists (as particularly *Glauberus*) have of late prepar'd Remedies not unuseful out of *Zinck* or *Spelter*. And I have already mention'd unto you an excellent Medical use of Silver, of which, prepared (as is there intimated) I have now this to adde, That since I began to write of it to you, I met with a considerable Person, who assures me, That she her self was by the use of it, in a short time, cured of the Dropsie, though, by reason of her having a Body very corpulent, and full of humors, she have been thought more then ordinarily in danger of that stubborn Disease. I have sometimes wondered, that there hath been so little care taken by Physitians, and even by Chymists, to investigate the Qualities of Mineral Earths, and those other resembling Bodies, that are, or may be, plentifully enough digg'd up in most Countries, though not the self-same in all; for however Men are pleas'd to pass them slightly over, as if they were but Elementary Earth, a little stain'd, or otherwise lightly altered: I have seen great variety of them, that have been digg'd sometimes within

within the compaſs of a little ſpot of Ground: and the differences of divers of them, both as to colour, taſte, conſiſtence, and other Qualities, have been too great, not to make me ſuſpect they were of very differing natures. And the true *Bolus Armenus*, and the *Terra Lemnia*, which is now brought us from the Iſland that gives it that name (mark'd with a Seal, which makes many call it *Terra ſigillata*, though that name be for the ſame reaſon apply'd to the *Terra Sileſiaca*, and other Medical Earths) have been ſo eſteemed, both by Ancient and Modern Phyſitians, as well againſt Malignant Diſeaſes, and the Plague it ſelf, as againſt divers other Diſtempers; that 'tis the more ſtrange, that (ſince the greateſt part of thoſe two Earths, that are now brought into our Countrys, have not, as the more skilful complain, the true marks of the genuine Earths, whoſe names they bear) Phyſitians have not been more careful to try whether their own Countrys could not furniſh them with the like, or as good, eſpecially in regard ſome of the few attempts of that nature, that have of late times been made, may give them much incouragement. For, not to believe the boaſts of the *Sileſian Johannes Montanus* (who paſſeth for the Inventor of the *Terra Sigillata Sileſiaca Strigonienſis*) in the Writing he publiſhed of the vertues of it, That 'tis Gold prepared and tranſmuted, by provident Nature, into an admirable Medicine; I finde that Learned Phyſitians prefer it before the *Lemnian* Earth, that is now brought from *Turky*: And the experienced *Sennertus* gives it this commendation, *Experimentis* (ſaith he) *multis jam probatum eſt, ejus inſignes eſſe vires contra peſtem, febres malignas, venenatorum animalium morſus, diarrhoean, dyſenteriam*: What he adds, that the Chymiſts name it *Axungia ſolis*, brings into my minde (what I ſhall hereafter have occaſion to mention more particularly to you)

Epitome ſcientiæ naturalis, lib. 2. c. 1.

that I had once brought me a certain Earth, by a Gentleman that digg'd it up in this, or some neighboring Country, which, though it seem'd but a Mineral Earth, did really afford, to a very expert tryer of Metals of my acquaintance, a not despicable proportion of Gold. They have also found in *Hungary*, an Earth, which they call *Bolus Tockavienſis*, which is affirmed by *Crato* (in *Sennertus*) to melt in the Mouth like Butter, and to have all the other proofs of the true *Bolus Armenus*, and therefore is, by that Judicious Phyſitian, preferred before the Modern *Bolearmony*, even that which was brought out of *Turky* to the Emperor himself; and he relates, not onely its having succeeded very well againſt *Catarrhs*, but his having experimentally found it of great efficacy in the Plague, that reign'd in his time at *Vienna*. To which I ſhall adde, That a very Learned and Succesful Engliſh Doctor, now dead, did, ſome Years ſince during a great Plague that then rag'd in the City where he liv'd, finde a vein of red Earth, not very far from that Town, and preſcrib'd it with very good ſucceſs in Peſtilential Feavers, as I was inform'd by an Ingenious Friend of his, that uſ'd to adminiſter it, and ſhew'd me the place where he digg'd it.

I remember alſo, the experienc'd Chymiſt *Johannes Agricola*, in his Notes upon what *Poppius* delivers of *Terra Sigillata*, after having much commended the *Terra Sileſiaca* in divers Diſeaſes, and equall'd it to the beſt of *Turky*, where he had travelled, relates one ſtrange thing of it, with many Circumſtances, and in a way as if he ſpoke upon his own tryal, namely, That the Spirit of *Terra Sigillata*, by which I think he means the *Strigonienſis*, doth, though ſlowly, diſſolve Gold as well as an *Aq. Regis*, and that into a red Solution; whence in two or three days, the Gold will fall of it ſelf into a very fine and ſubtil Powder. And the ſame Author

thor tells us, That he hath seen another Earth digg'd at the *Rheinstran*, not far from *Westerwaldt*, which was more inclinable to white then to yellow, which is preferable to the *Silesian*, and gives more Salt then it, and dissolves Silver better then other *Menstruums*; since, as he saith, the Silver may thereby be easily made potable, and be prepar'd into a very useful Medicine for the Diseases of the Head. And for my part, I do not much wonder at the efficay of these Earths, when I consider, that divers of them are probably imbu'd, as well as dy'd, with Mineral Fumes; or tincted with Mineral Juices, wherein Metals or Minerals may lie, as the Chymists speak, *in solutis principiis*; in which form, having never endured the Fire, many of their usefullest parts are more loose and volatile, and divers of their Vertues less lock'd up, and more dispos'd to be communicative of themselves, then they are wont to be, in a more fixed or coagulated state, or when they have lost many of their finer parts by the violence of the Fire.

Besides, there are several Mineral Bodies, which though perhaps they may not be of themselves fit for the Physitians use, may, by addition of some other convenient Body, or by sequestration of the more noxious parts, or by some such other Chymical Preparation, as may alter the Texture of such Minerals, be rendred fit to encrease the *Materia Medica*. As I have known, that by a preparation of *Arsenick*, with Salt Peter, whereby some of the more volatile and noxious parts are driven away, and the remaining Body somewhat fixed and corrected by the *Alcali* of the *Nitre*, it hath, by a farther dulcification with Spirit of Wine, or Vinegar, been prepared into a kinde of *Balsamum fuliginis*, which wonderfully cured a Physitian of my acquaintance, as he himself con-

confeſſ'd to me, of dangerous Venereal Ulcers (divers of which penetrated even to the *Meatus Urinarius*) which had reduc'd him to great extremity.

And though *Biſmutum* have not, that I know, till very lately been uſed, unleſs outwardly, and eſpecially for a Coſmetick (hereafter to be taught you) yet the Induſtrious Chymiſt, *Samuel Cloſſeus*, by calcination and addition of Spirit of Vinegar, and *Cremor Tartari*, makes two Medicines of it, which he highly extols in the Dropſie; and (to reſerve for another place, what I have tryed upon Tin-glaſs) a very expert Chymiſt of my acquaintance, doth, by preparing it with common Sublimate (carry'd up, by which I remember it hath afforded a very prettily figur'd Body) make it into a white Powder (like *Mercurius vitæ*) which he aſſures me he findes, in the Doſe of a few Grains, to purge very gently, without being *at all* (as *Mercurius vitæ* is wont to prove, *violently enough*) emetick.

Apud Sbrōderum in Pharmacop: lib. 3. cap. 18. Dr. *J. C.*

2. But the Naturaliſt may adde to the *Materia Medica*, not onely by inveſtigating the Qualities of unheeded Bodies, but alſo by gaining admittance for divers, that, though well enough known, are foreborn to be uſ'd upon the account of their being of a Poiſonous nature; for by digeſtion with powerful *Menſtruums*, and ſome other skilful ways of Preparation, the Philoſophical Spagyriſt may ſo correct divers noxious, nay poiſonous Concrets, unfit in their crude ſimplicity for the Phyſitians uſe, at leaſt in any conſiderable quantity, as to make them uſeful and effectual Remedies. *Helmont*, who though frequently extravagant in his Theory of Phyſick, doth often make no bad eſtimate of the power of Remedies, after having told us, That he ador'd and admir'd the Clemency and Wiſdom of God, for creating Poyſons, gives this account of his ſo doing: *Nam venena* (ſaith he)

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noluit nobis esse venena aut nocua. Nec enim mortem fecit, nec Medicamentum exterminii in terra: sed potius ut parvo nostri studio, mutarentur in grandia amoris sui pignora, in usuram mortalium, contra futurorum morborum sævitiem. In illis nempe latitat subsidium, quod benigniora & familiaria simplicia recusant alias. Ad majores & heroicos medentum usus venena tam horrida servantur. And though I would not forbid you, *Pyrophilus*, to think there is some *Hyperbole* in the *Encomiums* he here and elsewhere gives Poysonous Simples; yet when I consider, what great things are oftentimes performed by *Antimony*, *Mercury* and *Opium*, even in those not over-skilful ways of preparing them, that are divers of them vulgarly us'd by Chymists, especially when the preparations are (which doth seldom happen) rightly and faithfully made: I can scarce think it very unlikely, that those active Simples may, by a more skilful way of ordering and correcting them, be brought to afford us very noble Remedies. And the same Examples may in part prevent the main Objection that I can foresee in this case, which is, That whatever corrects Poysons, must, with their virulency, destroy their activity; for the above-named Simples, though so prepared as to be Medicines safe enough, have yet activity enough left them to let them be very operative, their energy being, by preparation, not onely in part moderated, but in part so over-ruled, as to work after a more innocent manner; as in *Bezoardicum Minerale*, *skilfully prepared* (for it very seldom is so) the laxative and emetick virulency of the *Antimony*, is changed into a diaphoretick, resolving and deoppilative power; which probably made the experienced *Riverius* (though counted a *Galenist*) so particularly recommend this Medicine to Physitians, which, if I be not mistaken, may well be prais'd without being flattered: And *Helmont* supplies

Helmont in Pharmac: & dispens: Modern. numero 46.

Helmont Tractat: supra allegato. Numero 46. 47.

plies me with an easie Experiment to our present purpose, by telling us, That *Asarum*, which when crude, doth, as is well known, provoke Vomits, by a slight preparation (presently to be mention'd) is so altered, that its virulency is changed, to use his expression, *in deoppilans, diureticum tardarum febrium remedium*; which I the rather take notice of, because I finde, upon enquiry purposely made of some Ingenious Physitians of my acquaintance, that upon tryal, they commend this preparation of *Helmont*'s, and confess, that by it the *Asarum* looseth its emetick, and acquires a diuretical Quality.

Helmont pag. 466.

Now that all other Animal and Vegetable Poysons may be corrected, without loosing their force with their virulency, is the affirmation of *Helmont* concerning *Paracelsus*'s and his *Sal circulatum (majus.)* And as for Vegetables, he elsewhere tells us, That the *Lapis Cancrorum* resolv'd in *formam*, as he speaks, *Pristinæ lactis, habet remedium contra inclementias multorum vegetabilium vi laxante infamium.* And I remember that I knew two Physitians, the one of which affirmed to me, his having seen tryal made (by the help of a noble *Menstruum*) of what *Helmont* here teacheth, and found it true; the other a person severe, and apt enough to dissent from *Helmont*, assur'd me, That with the volatile Salt of *Tartar*, he had seen Vegetable Poysons, and particularly *Napellus*, so corrected by a light digestion with it, that it lost all its Poysonous Qualities; for proof of which, he freely offered me, to take himself as much of that fatal Herb as would kill three or four Men (but at that time, and in that place, I could not get any of the Plant to make the Experiment with.) And though I shall say nothing now concerning *Helmont*'s *Sal Circulatum*, yet as to the volatilization of the Salt of *Tartar*, what I have seen, scarce permits me to doubt that

Helmont de Lithiasi. lib. 7. cap. 32.

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it is possible. And if I could now clearly acquaint you with my reasons, you would, perchance, not wonder to finde me inclinable to think, that some such Methods (perhaps a *Menstruum*) may be found to correct poisonous Simples, without rendring them ineffectual: And though it must be some very powerful corrective, whether Salt or Liquor, that shall be able to correct any store of differing Poysons; yet 'tis not irrational to think, that divers particular Concretes may be prepar'd without any such abstruse or general corrective, some by one way of handling it, and some by another: And in such cases, skill, in the natures of particular Bodies to be mannag'd, or lucky hits, may supply the place of a meliorating Dissolvent, of which *Helmont* affords me a considerable instance, where he teacheth (in the place lately quoted) That the emetick property of *Asarum* may be taken away, and the Plant turn'd into a noble diuretick, onely by boiling it awhile in common Water. And whereas a wary Man would be apt to suspect, that this change is made but by the avolation of some subtile parts, driven away by the heat of the boiling Water, I finde that our Author affirms, that though it be boil'd with the like degree of Fire in Wine, instead of Water, it will not so loose its violence. I have known white *Hellebor*, *Opium*, and some other noxious Bodies, so prepared, as to be given not onely harmlesly, but successfully in such quantities, as were they not skilfully corrected, would make them pernicious. We daily see, that the violent emetick and cathartick properties of *Antimony*, may singly, by calcination with *Salt-peter*, be destroyed. And (which is though a known, yet a notable Experiment among Chymists) *Mercury* sublimate may be deprived of its deadly corrosiveness, and prepar'd into a Medicine inoffensive even to Children, by bare resublimations with fresh *Mercury*. And to

Helmont in Pharmacop. & dispens. Modern. N. 46, 47.

give you one instance more of what the knowledge of the effects of Chymical Operations, and of the disposition of a particular Body, may enable a Man to do, in changing the pernicious nature of it; I shall adde, that the violently vomitive Flowers of *Antimony*, which our wonted, though sumptuous and specious Cordials are so unable to tame, I can shew you (which perhaps you will think strange) so corrected, without the addition of any thing besides *heat* and *skill*, that in a treble Dose, to that wherein they are wont to be furiously emetick, we have not found them to work otherwise then gently by sweat: But some more Particulars applicable to our present pupose, you will meet with by and by.

CHAP. IV.

Thirdly, And now, *Pyrophilus*, that I am speaking of the service that the Naturalist may do Physick, I must not pretermit that he may assist the Physitian to make his Cures less chargeable: For though to cure cheaply, be not properly, and in strictness, any part of the end of the Art of Physick, which considers Mens Health, and not their Purse; yet it ought in Charity, if not also in Equity, to be the endeavor of the Physitian, especially when he dealeth with Patients that are not rich. For not now to say any thing of the Fees of Physitians, which in some places are not very moderate, 'tis certain that the Bills of Apothecaries, especially in Chronical Diseases, do often prove so chargeable, that even when the Remedies succeed, by that time a poor Patient is recovered, he is undone, and pays for the prolongation of his Life, that which should have been his lively-hood: Whence it comes to pass, that the more necessitous sort of People are either fain to languish unrelieved, for want of being able to purchase

purchaſe health at the Apothecary's rates; or are deterred from applying themſelves to the Phyſitian, till their Diſeaſes have taken too deep root to be eaſily, if at all, eradicated: And this oftentimes, not more through the fault of the Apothecary, then of the Doctor, who in his Preſciptions might, for the moſt part, eaſily direct things that would be much more cheap, without being much leſs efficacious.

Now there are ſeveral Particulars, wherein it may be hop'd, that the Naturaliſt may aſſiſt the charitable Phyſitian to leſſen the charge of his Patients.

And firſt, He may perſwade the Phyſitian to decline that more frequent, then commendable cuſtom, of ſtuffing each *Recipe* with a multitude of Ingredients: 'Tis not that I approve the practice of ſome Chymiſts, who too freely cenſure the compounding of Simples; for I know, at ſome times, a complicated Diſtemper requires in its Remedy more Qualities, then are, perhaps, to be met with in any of the known Simples that the Phyſitian hath at command (though one and the ſame Simples may ſometimes anſwer divers Indications; as a Plant that is hot and dry, may ſerve for a Diſtemper that is cold and moiſt:) And I know too, that in ſome caſes to that Ingredient, that is as it were the Baſis of the Medicine, other things muſt be added either to correct its noxious Qualities, or to allay its vehemence, or to ſerve for a Vehicle to convey it to the Part affected, or to make it eaſier to be taken by the Patient, or to preſerve it from corruption, or for ſome ſuch like reaſon. But yet I think Phyſitians may well be more ſparing, as to the number of the things preſcribed, then moſt of them uſe to be, both to ſave charges to their Patients (upon which account it is that I here mention it) and for other conſiderations. For the addition of needleſs Ingredients adding to the bulk of the Medicine, makes it but the

more troubleſom to be taken, and the more apt to clog the Stomack: And oftentimes the Efficacy of the more uſeful Ingredients, as well as their Quantity in each Doſe, is much abated, by their being yok'd with thoſe that are leſs appropriated, or leſs operative. Beſides, it ſeems a great impediment to the further diſcovery of the Vertues of Simples, to confound ſo many of them in Compoſitions: For, in a mixture of a great number of Ingredients, 'tis ſo hard to know what is the operation of each, or any of them, that I fear there will ſcarce in a long time be any great progreſs made in the diſcovery of the vertues of ſimple Drugs, till they either be oftner imployed ſingly, or be but few of them employed in one Remedy. And beſides all this, whereas when one of theſe Mixtures is adminiſtred, the Phyſitian expects but ſuch operations as are ſuitable to the Quality which he conceives will be predominant in the whole Compound; ſeveral of the Ingredients may have particular Qualities that he dreams not of, which working upon a Body, that the Phyſitian conſiders as ſubject onely to the Sickneſs he endeavors to cure, may therein excite divers latent Seeds of other Diſtempers, and make new and unexpected commotions in the Body. On which occaſion I remember, that whereas Parſley is a very uſual Ingredient of aperitive and diuretick Decoctions and Apozems, a famous and learned Oculiſt tells me, he hath very often obſerv'd, That when he hath unawares, or for tryal-ſake employ'd Parſley, either inwardly, or even outwardly to thoſe that were troubled with great Diſtempers in their Eyes, he found the Medicines wherein that Herb was but one Ingredient among many, to cauſe either great pain or inflammation in the Eyes. In confirmation of which, I ſhall adde, that awhile after having a ſlight Diſtemper in my Eyes, I one day found it upon a ſuddain ſtrangely encreaſed, without being

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ing able to imagine whence these new Symptoms proceeded; till at length, recalling to minde all I had done that day, I remembred, that at Dinner I had eaten Sawce wherein there was a pretty deal of Parsley, mixt with other things. And whereas in divers of these Compositions some noxious Ingredients are allow'd, upon a supposition that their ill Qualities will be lost, by their being, as it were, tempered with the rest; though this may sometimes happen, yet it would be considered, that in Treacle (especially at one age of it) the *Opium* doth not, considering the small proportion of it to the rest of the Ingredients, loose much, if any of its power, by being mingled with sixty odde other Drugs, which Composition possibly ow's much of its vertue to that little *Opium*. And perhaps one reason why those that accustom themselves to be ever and anon taking Physick, though they often escape dangerous Diseases (by preventing the accumulation of humors, and taking their Sicknesses at the beginning) are yet almost ever troubled with one Distemper or other, may be, That by the multiplicity of Medicines they take into their Bodies, divers things are excited to disorder them, which otherwise would have lain quiet. I am not ignorant that it may be alledg'd, That in compounded Medicines, as *Treacle* & *Mithridate*, how many soever the Ingredients be, they do so clog & temper one anothers activity in the composition, that there results from them all, one or more Qualities fit for the Physitians turn, and which is the thing he considers and makes use of. And I confess, that in some cases this Allegation doth not want its weight: For I consider, that a decoction of Galls, and a solution of *Copperas*, though neither of them apart be blackish, will, upon their mixture, turn to Ink: And that when Brimstone, Salt-Peter, and Coals are well mingled together in a due proportion, they make Gun-Powder, a mixture,

mixture, that hath Qualities much more active then any of the ſever'd Ingredients. But I fear, that when a multitude of Simples are heap'd together into one compound Medicine, though there may reſult a new *craſis*, yet 'tis very hard for the Phyſitians to know before-hand what that will be; and it may ſometimes prove rather hurtful then good, or at leaſt by the coalition the vertues of the chief Ingredients, may be rather impaired then improved: As we ſee that crude *Mercury*, crude *Nitre*, and crude *Salt*, may be either of them ſafely enough taken into the Body in a good quantity; whereas of ſublimate, conſiſting of thoſe three Ingredients, a few Grains may be rank Poyſon. As for thoſe fam'd Compoſitions of *Mithridate*, *Treacle*, and the like, though I cannot well, for the mention'd Reaſons, commend the skill of thoſe that firſt deviſed them, and though I think that when one or two Simples may anſwer the ſame Indications, they may for the ſame Reaſons be more ſafely employed; Yet I would by no means diſcommend the uſe of thoſe Mixtures, becauſe long experience hath manifeſted them to be good Medicines in ſeveral caſes. But 'tis one thing to employ one of theſe Compoſitions, when tryal hath evinced it to be a lucky one, and another thing to think it fit to rely on a huddle of Ingredients, before any tryal hath manifeſted what kinde of Compound they will conſtitute. And, in a word, though I had not the reſpect I have for *Matthiolus*, and other famous Doctors that deviſed the Compoſitions, whereinto Ingredients are thrown by ſcores, if not by hundreds, yet however I ſhould not reject an effectual Remedy, becauſe I thought that it proved ſo rather by chance, then any skill in the Contriver: And I think a wiſe Man may uſe a Remedy, that ſcarce any but a Fool would have deviſ'd.

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Another thing, upon whose account the Naturalist (whom we here suppose an expert Chymist) may assist a Physitian to lessen the expensiveness of his Prescriptions, is by shewing, That in very many Compositions, several of the Ingredients, and oftentimes the most chargeable, whether they be proper or no for the Disease, are unfit for the way of management prescrib'd, and consequently ought to be left out. I need not tell you, that since Chymistry began to flourish amongst us, very many of the Medicines prepared in Apothecaries Shops, and commonly the most chargeable, are distill'd Waters, Spirits, and other Liquors: And he that shall survey the Books and Bills of Physitians, shall finde, that (very few perhaps excepted) the most usual Prescription is to take such and such Ingredients (for the most part numerous enough) and pouring on them either Water or Wine, if any Liquor at all, to distil them in *Balneo*, rarely in Ashes or Sand. But I confess I have not without wonder, and something of indignation, seen in the Prescriptions of Physitians, otherwise eminently Learned Men, and even in the publick Dispensatories, I know not how many things ordered to be distill'd, with others, in *Balneo*, which in that degree of heat will yield either nothing at all, as the fragments of Precious Stones, Leaves of Gold, prepar'd Pearl, *&c.* Or if they do yield any thing (for that hath not been yet, that I know of, evinced) do probably yield but a little nauseous Phlegm, or at least some few loose parts, far less efficacious then those that require a stronger heat to drive them up: such are Sugar, Raysins, and other sweet Fruit, Bread, Harts-horn, Flesh prepar'd by Coction, *&c.* which though wont to be thrown away with the *Caput Mortuum*, oftentimes there retain their pristine Texture and Nature, or at least are almost as much more considerable, then that which they yielded in Distillation: as a boyl'd

boyl'd Capon is, then the Liquor that ſticks to the Cover of the Pot. And though as to ſome of theſe Ingredients it may be thought that they may yield even in *Balneo* ſome of their uſeful parts, yet this can, with any probability, be ſuppoſ'd but of ſome of ſuch Ingredients: And even as to them it is but ſuppoſ'd that they may yield Something in ſo milde a heat, and how that Something will be qualified, is but preſum'd: at leaſt, by the Analogy of the Experiments vulgarly made, there ſeems ſo ſmall cauſe to exſpect, that theſe more fix'd Ingredients will adde half ſo much to the vertue of the Medicines, as they will to the coſt; eſpecially ſince though it could be prov'd, or were probable, that fix'd Snbſtances may communicate their vertues to Wine or Water, yet it would not follow that thoſe impregnated Liquors, diſtilled in *Balneo*, will carry thoſe vertues with them over the Helm. All which I have more largely prov'd in another Diſcourſe, where I ſhew both that the nobler parts of many Ingredients wont to be diſtill'd in *Balneo*, do commonly remain in the *Caput Mortuum*, and that 'tis very unſafe to conclude always the Vertues of diſtill'd Liquors from thoſe of the Concrets that afforded them.

But there is another way of putting unfit Ingredients into Medicines, by confounding thoſe in one Compoſition, which, though perhaps they might apart be properly enough employed, do, when mixed, deſtroy or lock up the Vertues of one another; and of this fault, even famous Chymiſts themſelves are but too often guilty. I know not how many Proceſſes I have met with, wherein ſaline Subſtances, of contrary natures, are preſcrib'd to be mingled, as if becauſe they were all of them ſaline, they muſt be fit to be aſſociated; whereas 'tis evident to any Man, that conſiders as well as employs the Operations of Chymiſtry, that there

there are ſcarce any Bodies in the World betwixt which there is a greater contrariety, then betwixt acid Salts: and as well thoſe that the Chymiſts call volatile, as the Spirits and Salts of Harts-horn, Blood, Fleſh and the like, as thoſe others which are made of Incineration, as Salt of *Tartar*, and of all burnt Vegetables. So that oftentimes it happens, that by an unskilful Mixture, two good Ingredients are ſpoil'd; as when Vinegar, Juice of Lemmons, Juice of Barberies, and the like, are preſcrib'd to be diſtill'd with other Ingredients, whereof the Salt of Wormwood or ſome other Plant makes one, for then the *acid* and *alcalizate* Salts, working upon one another, grow more fix'd, and yield in *Balneo* but a Flegm: and ſo Spirit of Urine, which is highly volatile, and Spirit of Salt, which is alſo a diſtill'd Liquor, being mingled together, will, by their mutual Operation, conſtitute a new thing, which in ſuch a heat as that of a Bath, will yield a Flegm, leaving behinde the nobler and active Parts concoagulated into a far more fix'd Subſtance, much of the nature of *Sal Armoniack*. And indeed where Salts, eſpecially active ones, are made Ingredients of Mixtures, unleſs they be skilfully and judiciouſly compounded, it often happens that they ſpoil one another, and degenerate into a new thing, if they do not alſo ſpoil the whole Compoſition, and of divers uſeful Ingredients compoſe one bad Medicine.

CHAP. V.

ANother way by which the Naturaliſt (skill'd in Chymiſtry) may help to leſſen the chargeableneſs of Cures, is by ſhewing, that as to divers coſtly Ingredients, wont to be employ'd in Phyſick, there hath not yet been ſufficient proof given of their having any Medical Vertues at all, or that at

leaſt as they are wont to be exhibited, either crude, or but ſlightly prepared in *Juleps*, *Electuaries*, *&c.* there is not any ſufficient evidence to perſwade us, that their efficacy is as much greater, then that of many cheap Ingredients, as their price is. I am not altogether of their minde, that abſolutely reject the internal uſe of Leaf-Gold, Rubies, Sapphyrs, Emerauds, and other Gems, as things that are unconquerable by the heat of the Stomack: For as there are rich Patients that may, without much inconvenience, go to the price of the deareſt Medicines; ſo I think the Stomack acts not on Medicines barely upon the account of its heat, but is endow'd with a ſubtle diſſolvent (whence ſo ever it hath it) by which it may perform divers things not to be done by ſo languid a heat. And I have, with Liquors of differing ſorts, eaſily drawn from Vegetable Subſtances, and perhaps unrectified, ſometimes diſſolv'd, and ſometimes drawn Tinctures from, Gems, and that in the cold. But though for theſe and other Conſiderations, I do not yet acquieſs in their Reaſons, that laugh at the adminiſtration of crude Gems, *&c.* as ridiculous; yet neither am I altogether of their Adverſary's minde. For though I deny not that the Glaſs of *Antimony*, which looketh like a kinde of Gem or Ruby, will eaſily enough impart to Liquors an emetick Quality; yet I know too, there is great odds betwixt Ruby's and other Gems (which will endure violent Fires, and remain undiſſolved in divers ſtrongly corroſive Liquors) and the Glaſs of *Antimony*, which is a Body ſo far leſs compact and fix'd, that Spirit of Vinegar it ſelf will work upon it, and a ſtrong Fire will, in no long time, diſſipate it into ſmoke. But that which I chiefly conſider on this occaſion, is, That 'tis one thing to make it *probable*, that 'tis *poſsible* Gold, Ruby's, Sapphyrs, *&c.* *may* be wrought upon by a humane Stomack; and another thing, to ſhew both that they

they *are wont* to be so, and that they *are* actually endow'd with those particular and specifick Vertues that are ascrib'd to them: Nay, and (over and above) that these Vertues are such, and so eminent, that they considerably surpass those of cheaper Simples. And I think, that in Prescriptions made for the poorer sort of Patients, a Physitian may well substitue cheaper Ingredients in the place of these precious ones, whose Vertues are not half so unquestionable as their Dearness.

What strange Excellency there may be in the *Aurum Potabile*, made by a true *Adeptus*, or by a Possessor of the Liquor *Alcahest*, I shall not now dispute, not knowing what powerful and radical Dissolvents the profound skill of such Men (if any such there be) may furnish them with, to open the Body of Gold. But as for the attempts and practices of the generality of Chymical Physitians to make Gold potable, besides that, their attempts to make their Solutions volatile, succeed so seldom, that even Learned Physitians, and Chymists, have pronounced the thing it self unfeasible; I confess, I should much doubt whether such a potable Gold would have the prodigious Vertues its Encomiasts ascribe to it, and expect from it: For I finde not that those I have yet met with, deliver these strange things upon particular Experiments duly made, but partly upon the Authority of Chymical Books, many of which were never written by those whose Names they bear. And others, I fear, commend *Aurum Potabile*, prepared after another-gues's manner then that we are now speaking of, partly upon a presumption that if it be made volatile, it must be strangely unlock'd, and exalted to a meer Spiritual Nature; and partly upon rational Conjectures (as they think them) drawn from the nobleness and preciousness of Gold. But for my part, though I have

long ſince bethought my ſelf of a way, whereby I can, in a ſhort time, and a moderate Fire, make my *Menſtruum* bring over crude Gold, in quantity ſufficient to make the Liquor look at the firſt or ſecond Diſtillation, of a high golden colour; yet finding that I could, by an eaſie Art, quickly recover out of this volatile Liquor, a corporal and malleable Gold, I dare not brag that my Tincture (as an Alchymiſt would call it) muſt needs do ſtrange feats, becauſe there is ſo noble a Mettal brought over in it. And if this or other preparations of *Aurum Potabile* prove good Medicines, it would be further enquired, whether the Vertues may not in great part be rather attributed to the *Menſtruum*, then the Gold (that requiring a very ſubtile Liquor to volatilize it) or to the aſſociation of the Corpuſcles of the Gold, with the ſaline Particles of the *Menſtruum*, into a new Concrete, differing enough from Gold, though never ſo well open'd. And as for the nobleneſs and pretiouſneſs of this Metal, That depends upon the Eſtimation of Men, whence in *America* the *Indians* that abounded with it, had not ſuch a great value for it; And in divers Countries, at this day, it is poſtponed to Iron or to Copper, and hath rather a Political (if I may ſo ſpeak) then a Natural Vertue. Nor will it follow, that becauſe it is the fixedſt and pretiouſeſt of Metals, that therefore it muſt be an admirable Medicine: For we ſee that Diamonds, though they be the hardeſt of Bodies, and very fix'd ones, and in much greater eſteem, *cæteris paribus*, then Gold, are yet ſo far from being accounted highly Medicinal, that they are commonly (though, perhaps, not ſo deſervedly) reckon'd among Poyſons. But I ſee I have digreſſ'd, That which I chiefly aim'd at, being to inculcate, that whether Gold and Gems, and the like pretious Ingredients, may be good Medicines or no, 'twere a good work to ſubſtitute cheap ones for the poorer

ſort

sort of Patients; and that Physitians are much to blame, who prize Simples, as Drugsters do, according as they are brought from remote Countries, and are hard to be come by, and cannot imagine that what doth not cost much Money in the Shops, can do much good in the Body; as if God had made Provision onely for the Rich, or those People that have Commerce with *China* or the *India's*: whereas indeed it may oftentimes happen, that what the Chymists call their *Caput Mortuum*, and perhaps throw away as an useless *Terra Damnata*, may have as great Vertues as those nobler Parts, as they call them, which they have extracted from it; and a despised Simple, nay, even an Excrement or an Insect, may in some cases prove nobler Remedies, then those that Men call and think very noble Bodies, not to say then, I know not how many Extracts and Quintescences.

I shall not trouble you with many Instances to prove this Doctrine, having more fully discoursed of it in one part of another *Treatise: But yet some Instances I suppose you will here expect, and therefore I shall present you with a few of those that at present come into my minde. * Of the efficacy of unpromising Medicines.

When the Distillation of *Aqua fortis* is finished, the *Caput Mortuum*, as deserving that name, is wont, by common Distillers, to be thrown away; and I have seen whole heaps of it thrown by, as useless, by those that make *Aqua fortis* in quantity to sell it: And yet this despised Substance doth, in common Water it self, yield a Salt, which being onely depurated by frequent Solutions and Filtrations, is that famous *Panacea Duplicata*, or *Arcanum Duplicatum*, which that great *Virtuoso* and knowing Chymist, The Duke of *Holstein*, whose name it also beareth, thought worth purchasing at the rate of Five hundred Dollars; and of which the Princes experienced Physitian thus writes to the Industrious *Schroder*,

Schroder Pharmacop. lib. 3. c. 23. *Schroder, Mille experimentis salis hujus Efficaciam Aula nostra comprobavit in melancholicis affectibus, febribus quibuscunque continuis & intermittentibus, calculo, scorbuto, &c. Quin & somnū conciliasse præsertim in Melancholicis non semel notavimus. Dosis à* scrup: 1. *ad* scrup: 2. *Libras aliquod quotannis absumimus.* And another very skilful Physitian that frequented that Excellent Princes Court, confirm'd to me the same Medicin's diuretick and deoppilative Vertues: (But upon my own Experience I can say little of it, having casually lost a great quantity I caus'd to be prepar'd to make tryal with, before I had opportunity to employ it.)

But whereas in the *Caput Mortuum* of *Aqua fortis* there remains pretty store of easily soluble Salt; In the *Caput Mortuum* of *Vitriol*, when not onely all the Oyl is forc'd away by the Fire, but all the fix'd Salt is exactly separated by Water, There seems to remain nothing but a worthless *Terra Damnata*: And yet 'tis of this, that, as I shall teach you ere long, I make those *Colcotharine* Flowers, which are possibly a nobler Medicine then either the Oyl, the Spirit, or the Salt of *Vitriol*.

As for the *Bezoar-stone*, which is so often prescrib'd by Physitians, and so dearly paid for by Patients, the experienc'd *Bontius*, a very competent Witness in this case (and whose account of the manner of its generation, agrees the best of any I have seen with that I receiv'd from an Intelligent Person, that was employ'd into *Persia* by the late King) hath in one place a Passage concerning it; and elsewhere writes such things of the Stone cut out of a Mans Bladder (though that, whil'st crude, be despis'd as a thing vile and useless in Physick) as may be justly applicable to our present purpose:

Bontius in cap. 45. Garcia ab Orta. *Cæterum* (saith he, speaking of the *Bezoar-stone*) *quantum ad hyperbolicas hujus lapidis virtutes & facultates portentosas non*

non tantos in eo mille experientiis edoctus inveni: And elsewhere speaking of those contemptible and excrementitious Stones that are found in humane Bladders: *Nil porro* (saith he) *de his lapidibus addo ne videar eos elevare & lithotomos monere ut vel cum periculo plures mortales secent: Hoc certe compertum habeo lapidem in vesica hominis repertum urinam & sudores probe ciere quod tempore ingentis illius pestis quæ Anno 1624 & 1625 Leydam patriam meam & reliquas Hollandiæ Civitates miserandum in modum vastabat, in penuria lapidis Besoartici nos exhibuisse memini & sudorificum (ausim dicere) melius & excellentius invenisse, &c.* *Idem cap. 46. Gartia ab Orta.*

Soot is generally look'd upon as so vile a thing, that we are fain to hire Men to carry it away; and yet, as I elsewhere shew that 'tis a Body of no ignoble Nature, so I must here tell you, that 'tis no unuseful one in Physick. And not to mention that *Riverius* commends it crude, to the quantity of a Drachme, in Plurisies: I have try'd, with the Spirit of it well drawn, some things, that make me look upon it as a considerable Liquor. And I know by their own confessions, that some Medicines, even of eminent Physitians, that pass under other Names, have the Spirit of Soot for their principal Ingredient. I knew, a not unlearned Emperick, who was exceedingly cry'd up for the Cures he did, especially in difficult Distempers of the Brain, by a certain Remedy, which he call'd sometimes his *Aurum Potabile*, and sometimes his *Panacæa*; and having obtain'd from this Man, in exchange of a Chymical Secret of mine he was greedy of, the way of making this so celebrated Medicine, I found that the main thing in it was the Spirit of Soot, drawn after a somewhat unusual, but not excellent manner; in which Spirit, Flowers of *Sulphur* were, by a certain way, brought to be dissolv'd, and swim in little drops that look'd of a golden colour.

You

You will easily grant, *Pyrophilus*, that there are not any Medicines to be taken into the Body, more cheap and contemptible then the Excrements of Men and Horses, and then Insects: And yet that even these want not considerable Medical Vertues, we elsewhere shew. And (not to meddle with such nasty things as the grosser sort of humane Excrements, though they outwardly apply'd, either in Powder or otherwise, do sometimes perform strange things) the Juice of Horse-dung, especially of Stone-horses, being strongly express'd (after the Dung hath been awhile steeped in Ale, or some other convenient Liquor, to facilitate the obtaining the Juice and to afford it a *Vehicle*) doth oftentimes so powerfully relieve those that are troubled with the stoppage of Urine, with Winde, Stitches, and even with Obstructions of the Spleen and Liver, that You, *Pyrophilus*, and I, know a great Lady, who though very neat, and very curious of her Health, and wont to have the attendance of the skilfullest Physitians, scruples not, upon occasion, to use as I have known her do, in Silver Vessels, this homely Remedy, and prefer it to divers rich Cordials, and even to what some Chymists are pleas'd to call *Essences* or *Elixirs*: And with the same Remedy very many poor People were cur'd of the Plague it self, when it lately swept away so many thousands in *Ireland* (and the Doctors with the Patients) as I was assur'd by a Person who cur'd so many, as to invite men to secure themselves that assistance, by refusing the Party the liberty to leave the Town. But (to adde that upon the by) this Person, in exchange of a Secret of mine, confess'd to me, That the *Arcanum*, which had cur'd such numbers, and to which the Juice of Horse-dung was a *Succedaneum*, was onely a good Dose of the Powder of fully ripe Ivy-berries, which did usually, as also the Horse-dung, work plentifully by

by Sweat, and which I presently remembred to be one of those few things that *Helmont* commends against the Plague.

The Medical Vertues of Man's Urine, both inwardly given, and outwardly apply'd, would require rather a whole Book, then a part of an Essay to enumerate and insist on: But referring you to what an industrious Chymist hath already collected touching that subject, I shall now onely adde, That I knew ancient Gentlewoman, who being almost hopeless to recover of divers Chronical Distempers (and some too of these abstruse enough) was at length advised, instead of more costly Physick, to make her Morning-draughts of her own Water; by the use of which she strangely recovered, and is, for ought I know, still well. And the same Remedy is not disdain'd by a Person of great Quality and Beauty, that You know; and that too, after she hath travelled as far as the Spaw for Her healths sake. And I remember on this occasion, that passing once through one of the remoter Parts of *England*, I was visited by an Emperick, a well-wisher to Chymistry, but a Novice in it, who pressing me, to communicate to him some easie and cheap Preparation, that he might make use of among the Countrey People; I directed him to Distil, with a gentle heat, a Spirit out of Urine, putrified for six or seven Weeks on a Dung-hill, or some analogous heat, but in well clos'd Glasses, or other glaz'd Vessels; and having rectified this Spirit once or twice, that it might be rich in volatile Salt, to give ten, twenty, or thirty drops of it in any convenient Liquor for the Plurisie, for most kinde of Coughs, and divers other Distempers, as a *Succedaneum* to the Essence of Harts horn: And awhile after this Emperick return'd me great thanks for what I had taught him; and I found by him and others, that he had

cured so many with it, especially of Pluriſies (a Diſeaſe frequent and dangerous enough in that Country) that this ſlight and ſeemingly deſpicable Remedy had already made him be cry'd up for a Doctor, and was like to help him to a comfortable Subſiſtence.

Great ſtore of healthy Mens Blood is wont to be thrown away, as altogether uſeleſs, by Chirurgions and Barbers, that let Men Blood (as is uſual in the Spring and Fall) for prevention of Diſeaſes; and yet from a Man's Blood skilfully prepared, though without addition of any thing, ſave Spirit of Wine to keep it at firſt from putrifying, may be eaſily obtain'd a Spirit, and volatile Salt, that have much the ſame Vertues, with thoſe of the newly mention'd Spirit of Urine, but more noble (as far as I can gueſs) then either that, or even Spirit of Harts-horn, as having perform'd in Conſumptions, Aſthma's, and other obſtinate caſes, ſuch things as I, as well as others, could not but admire. But in this place, mentioning humane Blood onely *in tranſitu*, I ſhall pretermit what I have obſerved about the preparation of it; yet leaving you a liberty to call for my Obſervations upon a Medicine, which is perhaps nobler, then the moſt coſtly and elaborate Chymical Remedies that are wont to be ſold in Shops, and which hath been almoſt alone excepted out of the Cenſure made by a Learned Modern Writer, of the Medicines found out by Chymiſtry.

I ſhall adde but one Inſtance more, of the efficacy that may be found in the moſt obvious and abject Creatures; and this Inſtance is afforded me, by thoſe vile Inſects commonly called in Engliſh, Wood-lice, or Sows, and in Latine *Millepedes*, which I have often both recommended to others, and taken my ſelf: What their Vertue is againſt the Stone, the World hath been informed by *Laurembergius*, who

who hath publiſhed a Narrative, how by the uſe of them he was cured, even of the Stone in the Bladder; and he was invited to uſe them by credible information, that others had been cured of that Diſeaſe, by the ſame Remedy. And of late Years, in *England*, an Emperick being much reſorted to, for the relief he gave in that tormenting Sickneſs, a Phyſitian, famous for his Learned Writings, wondering at what was done, was very curious (as himſelf afterwards told me) to finde out the Emperick's ſecret, and at length was ſo induſtrious as to diſcover, That 'twas a ſlight preparation of *Millepedes*. But my having found them in my ſelf very diuretical and apertive, is not that which chiefly recommends them to me; For I knew, and liv'd in the ſame Houſe with a pious Gentlewoman, much better skill'd in Phyſick, then her Sex promiſed, who having loſt the uſe of one Eye by a Cataract, and being threatned by the Oculiſts with the ſpeedy loſs of the other, eſpecially in regard of her being very aged and corpulent, ſhe nevertheleſs did, for ſome Years, to my wonder, employ her Eye to read and work with, without finding, as ſhe told me, any decay in it, or any encreaſing danger of a ſuffuſion: And ſhe aſſured me, that her Medicine was to bruiſe firſt five *Millepedes*, then ten, then fifteen, then twenty, *&c.* (daily encreaſing the number by five, till it had reach'd, if I miſtake not, fifty or ſixty) in White-wine (or Small-ale) and to drink upon an empty Stomack, the ſtrongly expreſſ'd Liquor; And when I deſired to know how ſhe came by this Specifick, ſhe anſwered me, That having made enquiries among all thoſe, both Oculiſts and others, that ſhe thought might aſſiſt her againſt ſo ſad a Diſtemper, ſhe was adviſed to the uſe of *Millepedes*, by a Woman, that not onely much magnified their vertue in ſuch caſes as hers, but aſſured her (if I much miſ-remember not) that ſhe her ſelf

had been cured by them, of no leſs then an incipient ſuffuſion in one or both of her Eyes.

[Since the writing of the former part of this Page, relating what I newly told you to a very Ingenious Phyſitian, he aſſures me, That being ſome Years ſince in *Holland*, he there met with a Woman who was cured, as her ſelf confeſſed to him, of a real Cataract, by the juice of *Millepedes*, beginning with that of three at a time, and ſo encreaſing to nine at once, and then gradually leſſening the Doſe by one Inſect each day, till ſhe were come back to three at a time; after which, ſhe gradually increaſ'd the Doſe as before: And he adds, That this Woman was adviſed to this Medicine by an Emperick, that was ſaid to have performed divers Cures with the ſame Medicine.]

[What ſtrange things theſe ſame *Millepedes* have done in the ſore, and even exulcerated Breaſts of Women (provided they be not cancrous) though they be given without preparation onely, to the number of three firſt, and ſo on to nine at once (which number may perhaps be uſefully encreaſed) ſtamp'd with a little White-wine or Beer, that the Liquor ſtrain'd out may be drunk in a draught of Beer, Morning and Evening; during which time, Linnen clothes dipp'd in White-wine, and apply'd warm, are to be kept upon the Breaſt, I may elſewhere have a fitter opportunity to relate. I ſhall now onely ſubjoyn, as a further proof of the great Vertue that may be even in vile and coſtleſs Inſects, and that without any elaborate or Chymical Preparation, this memorable Story; That after all the tryals I had made about theſe *Millepedes*, I met with a yong Lady, who by divers ſtrangely winding and obſtinate *Fiſtula's*, that had made themſelves Orifices in many places of her Body, was not onely lam'd, but ſo conſum'd and weakned, that ſhe was ſcarce able to turn her

her self in her bed; and this, notwithstanding the utmost endeavors of the eminentest Chirurgions, both English and Foreigners, that could be procur'd: But when both the hopes of her Friends, and those that endeavored to cure her, were lost, shewas in a short time not alone freed from her *Fistula's*, but recovered to a thriving condition of Body, by the frequent use of an internal Medicine, which, as both her Parents and the Person that taught it them informed me, was onely a Drink (to be taken twice or thrice a day) made of a small proportion of a couple of Herbs (very common, and not much more likely to do Wonders in this case, then Wormwood and Mint) and of Three hundred of these *Millepedes* well beaten (when their Heads are pull'd of) in a Mortar, and tunn'd up with the Herbs, and suspended in four Gallons of small Ale, during its fermentation. The wonderful efficacy of this Medicine in this and many other cases, which by occasion of this Cure were related to me, being almost wholly ascrib'd to the *Millepedes*, by the Illustrious Imparter of it, whose leave I have not yet, by naming him, to disclose, that this is the Secret He makes use of.]

CHAP. VI.

ANother way there is whereby the Naturalist may assist the Physitian to make the *Therapeutical* part of Physick less chargeable, and that is, by shewing those that are wont to employ most Chymical Remedies, that much of the cost and labor in many cases might be spared. I am not altogether of their minde, that indiscriminatly cry down Chymical Preparations as excessively dear: For of many of those that seem very dear, when bought by the Pound or the Ounce, a Dose may be cheap enough; as if for instance, an Ounce of precipitate

pitate of Gold and *Mercury* coſt ten times its weight of Silver, under which rate I have bought it of honeſt Men, that make it themſelves, yet that Ounce containing 480 Grains, (of which three or four may be a Doſe) a taking of this dear Powder, may coſt far leſs then a Doſe of many *Galenical* Medicines, where the quantity that is taken at once, makes up what is wanting in the coſtlineſs of the Ingredients. But though this be the caſe of *ſome* Chymical Remedies, yet we muſt not deny, that *many* others are chargeable, and though perhaps not more ſo then many *Galenical* ones employ'd for the ſame purpoſes: Yet if thoſe be dearer then they need be, that grievance ought to be redreſſ'd in Chymical Medicines, how juſtly ſoever the ſame thing may be imputed to *Galenical* ones.

Now there are two Particulars, wherein the Chymiſts, and thoſe Phyſitians that imitate them, are wont to be blameable in reference to this matter; The one, their employing Chymical Preparations on all occaſions, even where Simples or ſlight Compoſitions might ſerve the turn: and the other is, Their making many of their Preparations more laborious, and conſequently more chargeable then needs.

As for the firſt of theſe: 'Tis known there are divers Chymiſts, and others that practiſe Phyſick, who ſo dote upon the Productions of their Furnaces, that they will ſcarce go about to cure a cut Finger, with leſs then ſome *Spagyrical* Oyl or Balſam: And in ſlight Diſtempers have recourſe to Chymical, and perhaps to Mineral Remedies, which being, for the moſt part, ſuch as vehemently alter the Body, eſpecially by heating and drying it, they do often more harm then good, when employed in caſes that need not ſuch active Medicines. And methinks thoſe that practiſe, as if Nature preſented us nothing worth the accepting, unleſs it be cook'd

and

and perfected by *Vulcan*, might consider, That *Paracelsus* himself oftentimes employeth Simples for the cure even of formidable Diseases. And though for particular Reasons I be inclinable enough to think, that such searching and commanding Remedies, as may be so much of kin to the Universal Medicine, as to cure great numbers of differing Diseases, will be hardly obtain'd without the help of Chymical Preparations, and those perhaps of Minerals: Yet as to most particular Diseases, especially when not yet atriv'd to a deplorable height, I am apt to think, that either Simples, or cheap, or unelaborate *Galenical* Mixtures, may furnish us with Specificks, that may perform much more then Chymists are wont to think, and possibly be preferable to many of their costly *Magisteries*, *Quint-essences* and *Elixirs*. *Helmont* himself, a Person more knowing and experienced in his Art, then almost any of the Chymists, scruples not to make this ingenious Confession: *Credo* (saith he) *simplicia in sua simplicitate esse sufficientia, pro sanatione omnium morborum*: And elsewhere he truly affirms, That there may be sometimes greater Vertue in a Simple, such as Nature affords it us, then in any thing that the Fire can separate from it. And certainly the specifick Properties of divers, if not most Simples, are confounded and lost by those Preparations, wherein that Texture, which is the foundation of those Properties, is either destroyed by the Fire, or chang'd by the taking away of some of the Parts; or the adding of some other Substance to it, with which compounded, it may constitute a new thing. The more Judicious of the Chymists themselves do several of them now acknowledge, that the bare reducing of Pearls to fine Powder, affords a Medicine much richer in the Vertues of the Pearls, then the *Magistery*, prepar'd by dissolving them in acid Spirits, and precipitating them with Oyl

Helmont, Pharma: & Dispensat: Nov. p. 458.

of

of *Tartar*, and afterwards ſcrupulouſly edulcorating them. And one may eaſily obſerve, that by making the *Magiſtery* of Harts-horn the ſame way, the Vertues ſeem to be more lock'd up then they were in the crude Horn, which may eaſily enough impart its Vertue in the Body, ſince fair Water will reduce a good part of it into a Jelly; whereas the *Magiſtery* remains a fix'd Powder, not eaſily diſſoluble, even in acid *Menſtruums*; and, which thrown upon hot Iron, will ſcarce ſend forth that ſtinking Smoak, which argues the avolation of the ſaline and ſulphureous Parts. I never knew any of the vulgar Chymiſts *Eſſences* or *Elixirs* half ſo powerful a Remedy to ſtanch Blood, as a ſlight Mixture of two Drachmes of *Hyoſciamum*, or Henbane-ſeed, and the like weight of white Poppey-ſeeds, beaten up with an Ounce of Conſerve of red Roſes, into a ſtiff Electuary; with which, given in the quantity of a Nutmeg, or Wall-nut, I have ſnatch'd ſome, as it were, out of the Jaws of Death; and with which an eminent Phyſitian, now dead, affirm'd, That he, and the Inventor of the Remedy, had very frequently cured profuſe bleedings at the Noſe, and in Women, at other Parts beſides. Nor did I ever ſee, to give an inſtance in a reſembling Diſeaſe, ſuch wonderful Effects againſt ſpitting and vomiting of Blood, of the moſt elaborate Chymical Preparations, as I have of a ſlight Syrrup, made onely of a convenient quantity of fine Sugar, and the ſtrongly expreſſ'd Juice of twelve handfulls of Plantain-leaves, and ſix Ounces of freſh Cumfrey roots, well beaten together; with which Syrrup, beſides what I have try'd my ſelf, two eminent Phyſitians perform'd in that Diſeaſe unuſual Cures, though (for reaſons elſewhere mentioned) I forbear to name them, otherwiſe then by telling you, That one of them is that Ingenious and Friendly Dr *T. C.* to whoſe skill both You and I owe ſo much.

But

But I consider further, that as oftentimes those I am reasoning with make use of Chymical Remedies, when much more easily parable ones may suffice; so in divers cases, where Spagyrical Medicines are proper enough, their Preparations of them are more tedious and expensive then is necessary. There are more then a few who seldom prescribe, and seldomer esteem a Chymical Process, that is to be perfected in less then many Weeks; as if a Chymical Medicine, like an *Embryo*, must needs be an Abortive, if it be produc'd in less then so many Moneths. And as if in Preparations, the Vertue depended less on the skilfulness, then the elaboratness, they seem to estimate the efficacy of Remedies by the time and pains requisite to prepare them, and dare not think, that a Medicine can quickly cure, that was not long a making; as indeed theirs (especially those where Cohobations and Digestions, till they have such and such effects upon the Matter to be wrought on by them, are prescrib'd) are many of them far more toilsom and tedious, then those that have but read such Processes, without working them, are apt to suspect. And this is the humor of divers, not onely as to those stable Medicines, that ought always to be found ready in Apothecary's Shops, but even as to those that are design'd for particular cases, and perhaps acute Diseases; in which Emergencies, if a Physitian had no other Remedies then those he must make according to such Processes, it would, I fear, too often happen, that before the Medicine could be ready, the Patient would either be past the need of it, or past the help of it. And that which oftentimes encreaseth the tediousness of Chymical Processes, is the unskilful Prescriptions of those that devise them. 'Tis not unusual in Chymists Writings to meet with Processes, wherein the Matter to be prepar'd, is expos'd to I know not how many

 several

ſeveral ſucceſſive Operations: But if you ſhould ask why ſuch a thing ſhould be, for inſtance, rather precipitated, then exhal'd *ad ſiccitatem*, or why ſuch and ſuch an Operation is to be uſ'd after ſuch another, rather then before it; nay, perhaps, if one ſhould demand why ſome of thoſe Operations ſhould be uſed at all, the Deviſers of thoſe unskilful Proceſſes would poſſibly aſſoon be able to finiſh their Operations, as to give a ſatisfactory anſwer. Nay, ſometimes they lengthen their Proceſſes by Operations, ſo injudiciouſly preſcrib'd, that they croſs one another; And the Chymiſt vexeth himſelf, and the Matter he works upon, to leave it at laſt no better, if not a worſe, Medicine then he found it; of this we have already given an inſtance in the common *Magiſteries*.

But I lately met with another Example of it, in the Writings of a Famous, Modern Chymiſt, where to purifie the fix'd Salts of Vegetables, to the height, after I know not how many Solutions, Filtrations and Coagulations (which alone would abundantly ſerve the turn) he preſcribes the diſſolving them in *Aqua fortis*; after which, he ſaith, they will become very pure and chryſtalline, and not ſo eaſily reſoluble in the Air: Of which I make no doubt, for divers Years before I met with this Proceſs, I have, with the fix'd Salts of more then one kinde of Vegetable, by joyning them with *Aqua fortis*, and after awhile exhaling the ſuperfluous moiſture, made good inflammable *Salt peter*; by which you may eaſily gueſs, how judiciouſly the ſolution in *Aqua fortis* is preſcrib'd onely as a further depuration, and how fit ſuch Authors are to be credited, when they aſcribe to theſe Chryſtalline Salts the ſeveral Vertues, (& thoſe improved too) of the reſpective Vegetables, from which the *Alcalies* were obtain'd. And indeed, as to thoſe exact Depurations, which ſome Chymiſts

ſo

ſo ſtrictly require in all their Preparations, though their Proceſſes be oftentimes hereby made incredibly tedious, I will willingly allow, nay I aſſert, that in ſome caſes, and eſpecially in the making of powerful *Menſtruums*, which by their activeneſs and penetrancy, are to unlock other Bodies, Chymiſts do rather erre in making their Depurations leſs exquiſite then they ſhould, then on the other hand: Yet in many other caſes, ſuch exact refining and ſubtiliation of a Remedy, is not ſo neceſſary as they imagine; and ſometimes too, may do more harm then good, by ſequeſtring thoſe parts of a Simple, as *fæces*, which concurr'd with the finer parts to that determinate Texture, whereon the ſpecifick Vertues of it did principally depend; but of this more elſewhere. And therefore I ſhall here preſent you with two or there Inſtances, to ſhew you, That Remedies, at leaſt as noble as ſuch vulgar Chymical ones as are more tedious and coſtly, may be prepar'd in a ſhorter time, and cheap enough to be fit for the uſe of the Poor.

And to comply, *Pyrophilus*, with your curioſity, to know the Preparations of thoſe Chymical Medicines, that I do the moſt familiarly employ, the three following Inſtances ſhall be of ſuch, namely, The *Flores Colchotaris*, The *Balſamum ſulphuris craſſum*, and, The *Eſſentia Cornu cervini*, that you may ſee what ſlight and eaſie Preparations afford the Remedies, whoſe Effects you have ſo often heard of, if not alſo ſeen.

The firſt of theſe, is the ſame Powder, which paſſeth under the name of *Ens Veneris*, which appellation we gave it not out of a belief, that it equals the Vertues aſcrib'd by *Helmont*, to what he calls the true *Ignis Veneris*, but partly to diſguiſe it a little, and partly upon the account of the occaſion whereon it was firſt found out, which was, That an

Induſtrious Chymiſt (whom you know) and I, chancing to look together upon that Tract of *Helmont's*, which he calls *Butler*, and to compare it ſomewhat attentively with other Paſſages of the ſame Author, we both reſolv'd to try, whether a Medicine, ſomewhat approaching to that he made in imitation of *Butlers* Stone, might not be eaſily made out of calcin'd Vitriol; And, though upon tryals we found this Medicine far ſhort of what *Helmont* aſcribes to his, yet finding it no ordinary one, we did, for the Minerals ſake 'tis made of, call it *Ens primum Veneris*.

The Preparation, in ſhort, is this: Take good *Dantzick* Vitriol (if you cannot get *Hungarian* or *Goſlarian*) and calcine it till the *calx* have attain'd a dark red, or purpliſh colour, then, by the frequent affuſion of boyling, or at leaſt warm Water, dulcifie it exactly; and having freed it as well as you can from the ſaline parts, dry it throughly, and after mix it exquiſitly, by grinding, or otherwiſe, with an equal weight of pure *Sal Armoniack*, very finely powdered. Put this Mixture into a glaſs Retort, that may be but a third part fill'd with it, and ſubliming it in a ſand Furnace, by degrees of Fire, for ten or twelve hours, towards the latter end encreaſing the Fire, till the bottom of the Retort (if you can) be brought to be red hot: That which is ſublim'd muſt be taken out, and if it be not of a good yellow, but pale (which uſually happens for want of an exact commiſtion of the Ingredients) it may be return'd to the reſidue, mingled better with it again, and ſublim'd once more: The yellow, or reddiſh Sublimate may be ſublim'd a ſecond time, not from the *Caput Mortuum*, but by it ſelf; but if you re-ſublime it oftner, you may, though you will think that ſtrange, impair the Colour and the Sublimate, inſtead of improving them. The Doſe is from two or three Grains, to ten or twelve (in ſome

Bodies

Bodies it may be encreas'd to twenty or thirty, without danger) in distill'd Water, or small Beer, or other convenient Vehicles: It may be given at any time upon an empty Stomack, but I most commonly give it at Bed-time. It works, when it works sensibly, by Sweat, and somewhat by Urine. That it is a potent Specifick for the Rickets, I think I scarce need tell *You*, *Pyroph:* whose excellent Mother and Aunt, together with some Physitians, to whom I also gave it ready prepar'd, have cur'd perhaps a hundred, or more Children, of that Disease, divers of whom were look'd upon as in a desperate condition. I give it also in Feavors, and other Distempers, to procure sleep, which it usually doth where 'tis wanting: In the Head ache likewise, in which, if the Disease be inveterate, the Remedy must be long continued; with the like admonition it hath done Wonders, *in suppressione Mensium obstinata*: In the Worms it hath sometimes done strange things; and for provoking of Appetite, I remember not that I have either taken or given it without success: And though I seldom take (for I often give more) above two or three Grains of it at a time, yet in that small Dose it usually proves Diaphoretical to me the next Morning.

But the Experiments we have had of the several Vertues and Efficacy of this Medicine, would be here too tedious to recite; and therefore I shall now pass them by, though, if you require it, I shall not be backward to set you down, by way of observations, most of the cases wherein I or my Friends have given it, and of the principal Cures that have been performed by it: In the mean time, because this exalted *Colcothar*, being given in so small a Dose, may prove, if it be rightly and dexterously prepar'd, what *Helmont* saith of his imitation of *Butlers* Drif, *A Medicine for the Poor*, and

yet

yet requires more care, not to say skill, to Prepare it well, then upon the bare reading of the Process you will imagin, I shall to gratify your Charity annex to the end of this Essay, (for to insert them here would make too prolix a Digression) as many of the Particulars relating to the Preparation of it as I can readily meet with among my loose Notes, And least you should think me a Mountebanck for want of knowing in what sense it is, that I commend this and the other particular Medicins, I shall likewise to those Observations subjoyn a Declaration of my meaning in such particulars, and of the sense, wherein I desire you should understand what you meet with in the Praise of Remedies either in this Essay or any other of my Writings, which I hope it will be sufficient to give you this Advertisment of once for all.

The next Medicine I am to mention to you is the *Balsamum Sulphuris* which being made but with gross Oyls drawn by Expression may be called *Crassum* to distinguish it from the common and thinner Balsom of Sulphur, that is made with the Distil'd Oyl or Spirit of Turpentine.

This Balsom is made in an Houre or less, without a Furnace, onely by taking to one part of good Flower of Brimstone, foure or five times as much (in weight) of good expressed Oyl, either of Olives or Nuts, or Poppey-seeds, and boyling the former in the latter in a Pipkin half fill'd with both, till it be perfectly Dissolv'd into a Blood-red Balsom. But as easy as this Preparation seems (and indeed is) to them that have often made it, it will not at first be so easie to make it right; For the Fire which ought to be of well kindled Coals, must be kept pretty quick, and yet not over-quick, least the Oyl boyle over, or doe not well Dissolve the Flowers of *Sulphur*, but turn them with its self into a Clotted and almost Liver-colour'd Masse: And to a-

void

void these Inconveniencies, and the adustion of the Matter, speciall care must be had to keep it constantly stirring, not only whil'st the Pot is over the Fire, but after it is taken off, till it be quite Cold. You may if you think fit Dissolve this simple Balsom in Chymicall Oyl of Anny-seeds, or any other Essential Oyl like to advance its Efficacy in this or that particular Distemper: But those Oyls being generally very hot, I most commonly Prescribe the Balsom without those Additions, especially if long Digestion have somwhat lessened the Offensiveness of the smell, which though no peculiar fault of this Preparation being common to Sulphureous Medicins is yet the chief Inconvenience of it. I will not too resolutly affirme that this is the very *Balsamum Sulphuris Rulandi* of which that Author relates such wonderful things in his Centuries; but if it be not the same, tis so like it, and so good, that I doubt not but by perusing those Centuries, you may find divers uses of it, that I have not made tryall off: And in Coughs, old Strains, Bruises, Aches, (and sometimes the Incipcent fits of the Gout it self) and especially Tumors, some of your friends can inform you, that it doth much greater things then most Men would expect from so slight and easy a Preparation; And indeed greater then I have seen done by very costly and commended Balsoms and Oyntments, sold in Apothecaries Shops: And in those Observations, I lately told you you might command, you will find that this Balsom outwardly applyed, hath cured such obstinate Tumours, as Men either knew not what to make off, or what to doe with them, of which skilful Physitians, to whom I gave it to make tryal off in difficult cases, can bear me witness; Though it ought sufficiently to endear this Balsam to us both, that it was the Meanes of rescuing your Fair and Vertuous Sister *F:* from

a dangerous Consumption. In outward Applications it is to be well warm'd, and to be chaft'd into the part affected, which should be afterwards kept very warme, or else Lint dipped in it may be kept upon the place. Inwardly some drops of it may be given at any time, when the Stomach is not full; either rol'd up with Sugar, or mingl'd with any convenient Vehicle. But as for the Particulars that concern the Preparation of this Balsam, you will find, those I can readily meet with among my loose Papers, annex'd with the Notes concerning *Ens Veneris* to the end of this Essay.

And therefore I shall now proceed to mention the third Medicine, which you have often heard off, under the name of *Essence of Harts-horn*; but which is indeed onely the Simple, but well Purify'd and Dephlegm'd Spirit of it. And though Men are pleased to imagin by the Effects this Remedy often produces that I have some Mysterious or elaborate way of Preparing it, yet to deal ingenuously with you, the chief thing I have done to bring it into credit, is the teaching some Physicians and Apothecaries a safe and easy way of making it: For whereas before those that went about to Distil it, commonly used, as the Apothecaries are wont to doe in what they make of the same Matter, Shavings or Raspings of Harts-horn, and Distil'd it with a strong and naked Fire, the fugitive and subtle Spirits were wont to come over in that plenty, and with that impetuosity, as to break the Glasses to pieces, whereby Apothecaries and even Chymists were discouraged from drawing the Spirit, and they not having it in their Shops, its Vertues remained unknown: Whereupon considering that if it were onely broken on an Anvil into pieces of about the bigness of ones litle finger, besides that this way of comminution would

would be far less chargeable then Rasping, the fumes would not be driven out so fast, and considering too, that a violent Fire was requisite, not to Distil the subtle Spirit, but to drive over the Grosse and heavy Oyl; I thought it was needless to take paines to force that over, which not being (that I observ'd) used in Physick, would but cost me further pains to seperate it again: And therefore, trying to Distil Hartshorn, in naked Retorts, placed but in Sand, I found I could Distil two or three pound at a time, and obtain from each of them, almost, if not quite, all the Spirits and Volatile Salt, which I afterwards separated from the rediish and lighter Oyl, and freed them from Phlegm and Feculencies by a couple of Rectifications, made in tall Glasses, and with very gentle heats: (commonly of a Lamp Furnace) The *Dose* may be from eight, or ten Drops of the Spirit, or Graines of the Salt, to six times the quantity of either, in warm Beer, or any Vehicle that is not acid, except Milk. Finding it to be a Medicine of an attenuating, resolving, and Diaphoretical Nature, and one that much resists Malignity, Putrefaction, and acid Humours (whence being mingl'd with Spirit of Vinager, and the like soure Juyces, it destroyes their acidity.) I direct it (*Præmißis Universalibus*) in Feavers, Coughs, Pleurisies, Obstructions of the Spleen, Liver, or Womb, and principally in Affections of the Brain, as Stoppages of the Head, Feaverish *Deliriums*, and even *in Phrenitide*. And since I wrote a good part of this Essay, I had an Experiment of it in a Child, who being, by many violent Convulsion fits, reduc'd to a desperate condition, was recovered by one Dose of five or six Drops of this Spirit, that I sent it. 'Tis true that I have another Medicine, that is more elaborate and costly, and more properly bears the name of *Essentia Cornu Cervi*, which I

more value then this; But I cannot communicate that, without prejudicing a third Person, and an excellent Chymist who makes a great advantage of it. But this I can tell you, that most of the Cures, for which my Preparation of Harts-horn hath had the good fortune to be esteem'd, have been performed with the above describ'd Simple Spirit and Salt, with which some skilful Physitians, and other Ingenious Persons, who had it from me, have within these few Years sav'd so many Lives, that I am enclined to think, I have done no useless piece of Service, in bringing so happy a Medicine into Request, especially with those that have skill and oppertunity to make better use of it then I. But, *Pyrophilus*, I find I have detained you so long with so prolix a Mention, of the three above describ'd Remedies, that I should think it requisite, to make you a solemn Apologie; but that I hope your Charity will as well invite you to Pardon the fault, as mine induc'd me to commit it.

CHAP. VII.

A Fourth way of lessening the Charges of Cures, may be this; That whereas the dearness of very many Medicins proceeds from the Chargeableness of those Chymical Operations, whereby they are wont to be Prepar'd, 'tis to be hoped that a greater measure of skill in Physiology, and other Experimental Learning, will suggest cheaper and better ways of doing many things in Chymistry, then are, as yet, usually practis'd.

And those thrifty Expedients, I conceive, may be of several kinds, of which I shall at present mention, and that but transiently, three or four.

And first, I doubt not but Chymists may be taught to make

make better Furnaces, for ſeveral purpoſes, then thoſe that have been hitherto moſt uſ'd among them: For profeſſ'd Chymiſts, having been for the moſt part unacquainted enough with many other parts of Learning, and particularly with the Mechanicks, their contrivances of Furnaces and Veſſels have been far enough from being as good as knowledge in Mechanicks and dexterity in contrivances might, and, I doubt not, hereafter will, ſupply them with; whether as to the ſaving of Fuel, or to the making the utmoſt uſe of the Heat afforded by the Fuel they do employ, or as to the intending heat to the height, or as to the regulating of heat at pleaſure.

'Tis ſomewhat wonderful, as well as pleaſant, to ſee how many Veſſels may be duly heated by one Fire (perhaps no greater then common diſtillers employ to heat one Veſſel) if the Furnace be ſo contriv'd, as that the Flame may be forc'd to paſs in very crooked and winding Channels, towards the Vent or Vents, and the heat may be skilfully conveyed to the ſeveral parts of the Furnace, according to the Exigency of the work it is to do: And as for the intention of heat, I remember I have had odde effects of it, by the contrivance of a certain Furnace, that held but very few Coles, and to which I uſ'd no Bellows. But though by this way I could vitrifie ſometimes the very Crucibles, and thought poſſibly I could, with a ſlight alteration, melt down the ſides of the Furnace themſelves; yet a Diſciple of *Cornelius Drebell*, and a very credible Perſon, aſſur'd me, That he knew a way of Furnaces that was yet fitter to bring heat to the *ſuperlative* Degree; and that he himſelf, the Relator, could, by the meer force of Fire in his Furnace, bring *Venetian Talk* to flow; which is more, I confeſs, then ever I have been able to do either in mine, or thoſe of the Glaſs-houſe. But Ex-

perience hath assured me, 'tis easie to make a Furnace give that heat as expeditiously enough, and in other respects very conveniently to *Cupel* both Gold and Silver, without the least help of Bellows: That also Furnaces may be so ordered, as that the heat may be better regulated, then That in our ordinary ones, I may elsewhere shew you cause to believe: And in the meane time I shall only tell you, that I look upon the skill of intending and remitting heat at pleasure, and especially the being able to keep a gentle heat long and equal as a thing of much greater moment, both as to Physick and Philosophy, then Chymists are wont to think (the powerful effects of constant and temporate heats, being as yet known to few save those that have made tryal of them) And with Lamp Furnaces, well ordered, divers things may be done in imitation of nature; some friends of mine having, as several of them assure me, in such Furnaces, brought Hens egges to manifest Animation. That also Furnaces may be so built, as to save much of the Laborants wonted attendance on them, may appeare by the obvious invention of *Athanors* or Furnaces with Towers, wherein the Fire is for many Hours, (perhaps for twenty-foure or forty-eight) supply'd with a competent proportion of Coales, without being able to burne much faster then it should: And that in many cases the labour of Blowing may be well spar'd, and the annoyance of Mineral fumes in great part avoyded, by an easie contrivance, is evident by those Furnaces which are blown by the help of a Pipe, drawing the Air, as they commonly speak, either at the top, as in *Glaubers* fourth Furnace, or at the bottom, as for want of room upwards, I have sometimes tryed: To which may be added, that the casting of the Matters to be prepar'd upon quick Coals, as *Glauber* prescribes in that which he calls his first Furnace, is in some cases a cheap

cheap and expeditious way of preparing ſome Minerals; though his method of making Spirit of Salt in that Furnace would not ſucceed, according to his promiſe with me, and ſome of my acquaintance. And there are other more commodious Contrivances, by caſting ſome things upon the naked Fire, which invites me to expect, That there will be ſeveral good Expedients of employing the Fire to Chymical operations, that are not yet made uſe of, nor, perhaps, ſo much as dream'd of.

And as Furnaces, ſo the Veſſels that more immediately contain the Thing to be prepar'd, are queſtionleſs capable of being made more durable, and of being better contriv'd, then commonly they are. Good uſe may be made of thoſe Earthen Retorts, that are commonly call'd *Glauber*'s ſecond Furnaces, in caſe they be made of Earth that will well endure ſtrong Fires; and in caſe there be a better way to keep in the Fumes, then that he propoſes of melted Lead, which I have therefore often declin'd for another, as having found it lyable to ſuch inconveniences as I elſewhere declare.

But for Materials that are cheap, and to be diſtill'd in quantity, as Woods, Harts-horn, *&c.* the way is not to be deſpiſ'd, and is, as we may elſewhere have occaſion to ſhew, capable of improvement; though in many caſes this kinde of Veſſel is inferior to thoſe tubulated Retorts, that were of old in uſe, and mentioned by *Baſilius Valentinus*, and from which *Glauber* probably deſum'd that which we have been ſpeaking of. The utility of the way of ſealing Glaſſes hermetically, and of the Invention that now begins to be in requeſt of ſtopping the Bottles, that contain corroſive and ſubtle Liquors with Glaſs-ſtopples, ground fit to their Necks, inſtead of Corks, together with ſome other things, not now to be mention'd, keep me that I ſcarce doubt but

that

that if we could prevail with the Glaſs-men and the Potters, to make Veſſels of Glaſs and Earth exactly, according to directions, many things in Chymiſtry might be done better and cheaper then they now are; and ſomethings may be then done, that with the forms of Veſſels now in uſe cannot be done at all. And if that be true which we finde related in *Pliny*, and with ſome other Circumſtances in *Dion Caſsius*, of a more ingenious then fortunate Man, who, about his time, was put to death for having made malleable Glaſs, as the truth of that Story, if granted, would ſhew the retriving that Invention, a thing not to be deſpair'd of: So he that could, now Chymiſtry is ſo cultivated, finde again the way of making Glaſs malleable, would be, in my Opinion, a very great Benefactor to Man-kinde, and would enable the *Virtuoſi*, as well as the Chymiſts, to make ſeveral Experiments, which at preſent are ſcarce practicable; and ſome Chymiſts would perhaps think the attempt more hopeful, if I tell them firſt, that I remember *Raymund Lully* expreſly reckons it among three or four of the principal Vertues he aſcribes to the Philoſophers Stone, that it makes Glaſs malleable; and then, that an expert Chymiſt ſeriouſly affirm'd to me, that he met with an *Adeptus*, who, among other ſtrange things, ſhew'd him a piece of Glaſs, which the Relator found, would endure and yield to the Hammer: But what my own Opinion is concerning this matter, and what are the (uncommon) Inducements I have to be of it, I muſt not here declare.

And on this occaſion, I remember I have ſeen an Inſtrument of Tin, or Pewter, for the drawing of Spirit of Wine (which you know is one of the chargeableſt things that belong to Chymiſtry) ſo contriv'd, that whereas in the ordinary way much time, and many rectifications, are requiſite

to

to dephlegm Spirit of Wine; one distillation in this Vessel will bring it over from Wine it self, so pure and flegmless, as to burn all away. And I remember, that the ancient French Chymist, in whose Laboratory I first saw one of these Instruments, told me, That 'twas invented, not by any great Alchymist or Mathematician, but by a needy *Parisian* Chyrurgion. And now I speak of Spirit of Wine, I shall adde; That as the charges of Chymistry would be very much lessned, if such ardent Spirits could be had in plenty, and cheap; so I think it not improbable, that in divers places there may be found, by Persons well skil'd in the Nature of Fermentation, other Vegetable Substances far cheaper then Wine; from which an inflammable, and saline Sulphureous Spirit, of the like vertue, for dissolving resinous Bodies, drawing Tinctures, *&c.* may be copiously obtain'd: For not only, 'tis known, that Sydar, Perry, and other Juyces of Fruits will afford such a Spirit; and that most Graines, not very unctuous, as Barley, Wheat, *&c.* will do the like; but other Berries that grow wild, as those of Elder, will yield a Vinous Liquor. And in the *Barbada's* they make a kind of Wine, even of Roots, (I mean their *Mobby*, which they make of Potatos; as I have also, for curiosity sake, made Bread of the same Roots) nay, even from some sorts of Leaves, such a Liquor may be obtain'd: For I have observed Roses well fermented, to yield a good Spirit very strongly tasted, as well as inflammable. And as to the Preparing of pure Spirit of Wine it self, I know wayes (and one of them cheap) that may exceedingly shorten the time, and pains of dephlegming it; but that being to be done otherwise, then by any peculiar contrivance of Furnaces or Glasses, I reserve it for a fitter place, in one of the following Essays.

And as more expedient and thrifty wayes, then the vulgar ones,

ones, of making Chymicall Furnaces and Veſſels, may be deviſ'd; ſo 'tis to be hoped that a skilful Naturaliſt may find cheaper waies of heating the Chymiſts Furnaces, or Diſtilling in his Veſſels (either by finding combuſtible Materials, not formerly in uſe in the places where we work, or by making thoſe already imployed fitter for uſe) by bringing them, by ſome cheap alterations, either to give a greater, or a more durable heat, or to be leſs offenſive by their ſmoak or ſmells; or elſe by diſcovering ſome cheap way of doing, in ſome caſes, without Fire, what was wont to be done by it.

We ſee that in ſome places, eſpecially here in *England*, where Char-coale was only burnt in Furnaces, Pit-coale is ſubſtituted in its room; and at this Day there are ſeveral of thoſe that make *Aqua-Fortis*, in great quantities, that Diſtil it with ſuch Coales, which coſt nothing neer ſo much as thoſe made of Wood. And experience hath inform'd me, that even in other ſorts of Furnaces, the ſame Fuel may be imploy'd, provided the Barres of the Grates be ſet wider aſunder, and a little Char-coale be mingled with it for the better kindling; and ſince of late Years Pit-coale have been found in ſeveral places among us, where they were not formerly known to be, it ſeems not improbable, that many other Countries may afford Chymiſts, and the reſt of their Inhabitants the like advantage, if ſearch were duely made, by boring of the ground, by the obſervations of the Waters, and the Steames of places ſuſpected, and by other waies of inquiry that a skilful man might direct; But becauſe the abundant Smoak of Pit-coale, uſes to be very offenſive, and the ſmaller Coales eaſily run through the Grates, and becauſe of other inconveniences, there hath been a way found out of charring theſe Coales, and thereby reducing them into

to

to coherent Maſſes, of a convenient bigneſs and ſhape, and more dry and apt to kindle; and theſe though, quantity for quantity, their price be little inferiour to that of Char-coale. Yet thoſe that conſume great proportions of Coales, tell me they finde them almoſt as cheap again, in regard they will not only laſt much longer, but give (eſpecially near at hand) a far more intenſe heat: And therefore it muſt be a very uſeful thing to Chymiſts, to ſhew a way of charring Sea-coales, without the help of thoſe Pots, which make them of the price they now beare. And that it is not only poſſible, but very eaſy, I could quickly ſhew you, if it would not prejudice an induſtrious Laborant, whoſe profeſſion being to make Chymicall Medicines in quantity, obliges him to keep great and conſtant Fires, and did put him upon finding a way of charring Sea-coale, wherein it is in about three houres or leſs, without Pots or Veſſels, brought to Char-coale; of which having, for curioſity ſake, made him take out ſome pieces, and coole them in my preſence, I found them upon breaking to appeare well charr'd, and much thereof in ſhew not unlike a Marchaſite. And that which was very convenient in this Contrivance was, that whil'ſt the Pit-coale was charring, it afforded him a very intenſe heat to melt or calcine the Minerals, he had occaſion to expoſe to it: And he confeſt to me, that by this Method, he ſaved three parts in foure of the Charges the keeping ſuch great and conſtant Fires, with common Char-coale, would coſt him. In *Holland*, likewiſe, they have a way of charring Peat, (which is a combuſtible Turfe, that they dig under Ground) and a skilful Diſtiller, that much employ'd it, commends it to me, as a very good Fuel, even for Chymical Fires; which I therefore mention, becauſe the way of charring Peat, is not yet brought into ſeveral Countries, where Peat is dig'd up:

And probably, it would be found in divers Regions, where 'tis yet unknown, if due ſearch were made for it. To which I may adde, that 'tis not unlike, that ſome Countries may afford ſuch combuſtible Materials, fit for Chymical Furnaces, as have not, as yet, been ſo much as nam'd by Mineraliſt's; as I remember I have ſeen, and had, a ſort of Coales, ſome of which look'd like Marchaſites, that burn'd clear with a good Flame, and had this convenient quality, for the Chymiſt's uſe, that they were not apt, like the common Pit-coales, to ſtop the Grates with their Sinders, but burnt to whitiſh Aſhes almoſt like Char-coale made of Wood; and yet gave ſo great a heat, that an Induſtrious Chymiſt of my acquaintance, who kept many things conſtantly at work, found it worth while to have them brought him, above a daies journey, on Horſes backs.

But 'tis not impoſſible, that when Men grow better Naturaliſt's, they may find waies, of exciting heat, enough for many Chymicall operations, without the help of Fire; and conſequently, without the conſumption of Fuel. We find that by the attrition of hard Bodies, conſiderable degrees of heat may be produc'd, not only, in combuſtible Materials, as Wood, and the like, (which would therefore be improper, to be here inſiſted on) But in others alſo, and particularly in Iron and Steel, one may by attrition ſoon produce a ſmart heat, as you may quickly try, by nimbly Filing a piece of Iron, with a rough File; or ſwiftly rubbing, though but for a few minutes, a thin piece of Steel againſt a Board. And whether ſome contrivance may not be found, by the help of cheap Engines mov'd by Water, or otherwiſe, to produce a durable heat in Iron Veſſels, fit to digeſt in, we may elſewhere have further occaſion to conſider; But this is known, that from ſome ſucculent Plants, a Liquor may be drawn,

drawn, only by expoſing them in Glaſſes, purpoſely contrived to the Beames of the Sun. And there is nothing more common, then for Chymiſts to make their Digeſtions by the warmth of Horſ-dung, whereby they might alſo (as ſome Analogous tryals incline me to think) conveniently enough, Diſtil ſome fermented Liquors; eſpecially, if the way were improv'd by the skilful addition of Quick-lime, and ſeaſonable aſperſions of Water. And I doubt not but many cheap Materials might, by a few tryals, be found, whereby portable digeſting Furnaces, without Fire, (if I may ſo call them) might be made, without the ill ſmell and naſtineſs, which diſcommends the uſe of Horſ-dung. For not only we ſee, by what happens in the Spontaneous heating of Malt, and ſome other familiar ſubſtances, that probably moſt ſort of Graines, and Berries, fit for Fermentation may be brought to yeeld, for a good while, a heat great enough to putrifie, or digeſt with: But I have, ſeveral Years agoe, by many trials found; that I could, by invironing Glaſſes with refuſe Hay well preſſ'd down and equally wetted throughout, produce for divers daies ſuch a heate, as made me decline the employing of Horſ-dung; and yet (which is the chiefe thing for which I mention this) the quantity of Hay was ſo ſmall, that in all my trials I found not, that the Hay did of it ſelf, though kept cloſe enough, take Fire; as elſe is uſuall in Ricks of Hay not ſufficiently dried, where the quantity, and conſequently the weight, that preſſes the lowermoſt parts cloſe together, is conſiderable.

But further, in diver's operations, where an actual Fire is requiſite, it may be hop'd that Knowing Men, may diſcover waies of ſaving much of the Fire, and making Skill perform a great part of the wonted office of heat. To obtain the

Spirit of fresh Urine, you must Distil away near nine parts of ten, which will be but Flegm, before the Spirit or Volatile Salt will (and that scarce, without a pretty strong heat) regularly rise. And there are several Chymist's that, to this day, make use of no better way of Distiling Urine; But he that knows, how Putrefaction opens many Bodies, may easily save himself the expence of so much Fire: For if you let Urine stand well stop'd, for eight or ten Weeks, the Saline and Spirituous parts will so extricate themselves, that the Spirits that before staied behind the Flegm, will now, even with the gentlest heat, rise up first, and leave the Flegm behind. And on this occasion I shall teach you, what I do not know to have been mention'd by any Writer; namely, That even of fresh Urine, without Digestion or Putrefaction, I can, by a very cheap and easie way, make a subtle and penetrant Spirit, ascend, first, even in a gentle heat; And I am wont to do it only by pouring Urine, how fresh soever, upon Quick-lime, till it swim some Fingers breadth above it, and then distilling it assoon as I please. But I did not find, upon many trials, that this Spirit, though even without Rectification very strong and subtle, would Coagulate Spirit of Wine, like that of putrified and fermented Urine; though, perhaps, for divers other purposes it may be more powerful.

And here I shall advertise You, that whereas I just now took notice, that there was a pretty strong Fire requisite to force up the Salt of unfermented Urine, out of that part, which after the abstraction of the Phlegm, remains of the consistance of Honey; trial hath inform'd me, That the volatile Salt may out of the thick Liquor be obtain'd, better and more pure, with ease, and with a, scarce credibly, smal heat; barely, by tempering the Urinous extract with a convenient

venient quantity of good Wood Aſhes, whereby (for a reaſon elſwhere to be conſider'd) the volatile part, of the Salt of Urine, is ſo free'd from the groſſer Subſtance, that with ſtrange facility it will aſcend, fine and white, to the top of very tall Glaſſes. But of the differing Preparation of Urine, more perhaps elſwhere. I now proceed to tell you, that I think it not unlikely, that even Bodies, which are more groſs and ſluggiſh, may by the affuſion of ſuch *Menſtruums*, as humane Induſtrie may find out, be far more eaſily, either, volatiliz'd or unlockt, then common Chymiſts are wont to think. For I know a Liquor, not very rare among Chymiſt's, by whoſe help I have, often enough, diſtill'd Spirit of Nitre, (whoſe diſtillation requires much about the ſame violence of Fire, with that of *Aqua-Fortis*) even in a moderate heat of Sand, and without a naked Fire. This Spirit may eaſily enough be brought over, even in a Head and Body; and, for a Wager, I could obtain a little of it without any Fire or outward heat at all. And I remember, alſo, That having once digeſted a certain *Menſtruum*, for a very ſhort time, upon crude *Antimony*, and abſtracted it, in a very gentle heat, of Sand; the Liquor, not only, brought over ſome of the *Antimony* in the form of red Flowers, ſwiming in it, and united other parts of the Mineral, with it ſelf, in the tranſparent Liquor, but the gentle heat raiſed to the top of the Retort, divers little Maſſes of a ſubſtance, that were very tranſparent, like *Amber*, which were inflammable, and ſmelt, and burnt blew, juſt like common *Sulphur*; And yet the *Menſtruum*, which was eaſily again recoverable from the *Antimony*, was no ſtrong Corroſive, taſting, before it was pour'd on, not much unlike good Vinager.

But beſides all the wayes, above mentioned, of ſaving the Chymiſt, either, Time, or Fire, or Labour; I diſpair not that

that divers others, yet unthought on, will be in time found out by the Industry of skilful Men, taking notice of the nature of things, and applying them to Chymical uses; as we see, that by Amalgamations with *Mercury*, the calcination of Gold, and Silver, may be much easyer perform'd, then by a long violence of Fire. And, (if it be true, what *Helmont*, and *Paracelsus*, tell us of their immortal Liquor *Alkahest*) Medicines far nobler, and otherwise more difficult to make, then those hitherto in use among the Chymist's, may be Prepar'd with greater ease, and expedition, and with far less expense of Fire, then the nature of the Mettals, and other Concretes, to be open'd by it, would let a vulgar Chymist suspect. However, I see no great cause to doubt that there may be *Menstruum's* found that will much facilitate difficult Operations, since not to mention again the Liquor, I lately told you, would work such a change on Nitre (and, I might have added, on some other compact Bodies) 'tis very like, there may be *Menstruum's* found, that will not be so spoyl'd by a single Operation, made with them, as our vulgar saline Spirits are wont to be. For I have try'd that a *Menstruum*, made by the bare distillation of good Verdigrease, will not only draw, as I have formerly told you, a Tincture of Glass of *Antimony*, or perform some other like Operation for once, but being drawn off from the dissolved body, or the extraction, will again serve, more then once, for the like Operation upon fresh Materials.

The fifth, and last way, *Pyrophilus*, that I intend to mention, of lessening Chymical expenses; is, That the Naturalists may probably find out wayes of preserving some Chymical Medicins, either longer or better, then those wayes that are usual. But of this preservation of Bodies, being like, as I formerly intimated, to have elsewhere further occasion

casion to Treat; I shall now only say, That the purified Juyces, liquid Extracts, *Robs*, and other soft Medicaments, made of Plants, may be Conserv'd far cheaper, aswel as better, then with Sugar (which clogs most Mens Stomacks, and otherwise disagrees with many Constitutions) in case *Helmont* say true, where he tells us, That for a small piece of Money, he can, for I know not how long, preserve whole Barrels of Liquor. And a way he intimates, of fuming liquors with *Sulphur*, I have allready told you, is a very good way of keeping them uncorrupted; provided, that (though he prescribes it not) they be six or seven several times (seldomer or oftner, according to the quantity or nature of the Liquor) well impregnated with that embalming Smoak; to which purpose it is convenient to have two Vessels, to poure from one to the other, that whil'st the Liquor is shaking in the one, the other may be well fill'd with Smoak; whereto I shall only subjoyn this secret, which a friend of mine, practises in preserving the fumigated Juyces of Herbs (as, I elswhere inform you, I do to preserve other things) with a succes that I have somewhat wondred at; which consist's, in adding to the thick Liquor, to be preserved, a due, but small, proportion of the white *Coagulum*, (which I often elswhere mention) made of the pure Spirits of Wine and Urine.

But I have made this excursion too prolix, and therefore I shall only adde as a general admonition, that we are not, by the common practice of Vulgar Chymist's, to estimate what Knowing Naturalist's, skill'd in Mechanical contrivances, may be able in time to do, towards the making of Chymical Remedies, as well more *cheap* as more *effectual*; and, indeed, to make them more *effectual*, is the best way to make them more *cheap*.

For,

For, *Pyrophilus*, after all the wayes, that I have mention'd, whereby the charges, of the *Therapeutical* part of Physick, may be lessned; I must advertise you, both, That I make no doubt but there may be divers others found, which either through want of skill or leasure I have pretermitted, and that I have not yet named the principal of all; which is, That the deep insight into Natural Philosophy may qualifie him that hath it by several wayes, and especially by discovering the true Causes and Seats of Diseases, to find out such generous and effectual Remedies, (whether Specificks, or more Universal *Arcana*) as by quickly freeing the Patient from his Disease, may exempt him from needing, either, much Physick from the Apothecary, or many chargeable visites from the Doctor of Chirurgeon. Thus the rich Merchant I mention'd in one of the former Essayes to have been freed, by a Specifick, from the Gout; and the young Lady, cur'd of her Fistulas, by the infusion of *Millepedes*; might well, in the ordinary way, have spent, even supposing them thrifty, a hundred times more, upon Physitians and Physick, then the potent and nimble Remedies, whereby they were so happily recovered, cost them.

[To which I shall adde, by way of Confirmation, both of this and of what I lately told you; concerning the Efficacy that may be, even, in slightly Prepared Simples; what I came to learn, since the writing of the former part of this Essay, namely, that a young Lady, who (though of great Birth, is yet of far greater Beauty and vertue, whom I presume I need not name to you) having been long troubled with an almost hereditary Epileptical Distemper, and after having been wearied by courses of Physick prescrib'd her, by the famousest Doctors that could be procur'd, without at all mending, but rather growing worse, so that sometimes

times She would have, in one day, eight or ten of such dismal Fits, as You and I have seen her in; was cur'd onely by the Powder of true *Misseltoe* of the Oake; given as much as would lie upon a Sixpence, early in the morning, in black Cherry Water, or even in Beere, for some days near the full Moon. And I am assur'd, partly, by the Patient her self, and, partly, by those that gave her the Medicine, That though it had scarce any other sensible Operation upon her, and did not make her sickish, especially, when she slept upon it; Yet, after the first day she took it, she never had but one Fit. And this Remedy, an ancient Gentleman, who, being casually present when she suddenly fell down as dead, gave it her, profess'd himself to have constantly cur'd that Disease with it, when he could procure the right Simple, which is here exceeding scarce. And what further Experiment some Friends of Yours have succesfully made, of its Vertue, I may elswhere have occasion to relate.]

To which I shall only adde, That one of the Skilfullest Methodist's I ever knew, having had much adoe to preserve a young Cousin of Yours from a very dangerous Cough, by a long course of Physick; the party, at the beginning of the next Winter, falling into a Relapse more threatning then the first Disease, was rescued from it in two or three days, by not many more takings of a Specifick sent her, made of nothing else but Hartſ-horn prepar'd as I lately taught You. And if such slight Medicines, consisting, each of them, but of a single Simple, not elaborately prepar'd, may sometimes (for I say not alwaies) perform such speedy cures even in Chronical Distempers, what may not be hoped from the *Arcana majora* (such as *Paracelſs's Laudanum*, so praised by *Operinus* himself; and *Butlers Driff*, so extold by *Helmont*) when the skilfullest Preparations, of

the nobleſt Simples, ſhall come to be known by Learned and Judicious Men, intelligent in the *Theory* of Phyſick, and eſpecially verſ'd in the Hiſtory of Diſeaſes? And though *Riverius* were none of the greateſt Naturaliſts, or, at leaſt, Chymiſts, Yet if in his Obſervation, and elſwhere, he flatter not his own *Febrifugum*; how many Patients did that one Specifick, reſcue from Quartanes, that would elſe probably have prov'd as Chargeable as Tedious?

But, *Pyrophilus*, having ſayed ſo much, that I fear you have thought it tedious, to ſhew that a Naturaliſt, skill'd in Chymiſtry and the Mechanicks, may aſſiſt the Phyſitian to make his cures leſs Chargeable; 'tis high time, that after ſo long an excurſion, I proceed to conſider in what other particulars he may be a benefactor to the Phyſitians Art.

CHAP. VIII.

FIftly, then, that the Naturaliſts skill may improve the *Pharmaceutical* Preparations of Simples, by ſeveral wayes partly touch'd already, and partly to be, either, added or further treated of; the great variety of new Remedies, wherewith the Laboratories of Chymiſts have furniſhed the ſhops of Apothecaries, may convincingly inform you. To which I muſt take the liberty to adde (and that upon ſerious Conſideration) That *the Chymical Preparations, hitherto common in Diſpenſatories, are, as to the Generality of them, far enough from being the moſt Dextrous, or Noble, that can be deviſ'd*: For our Vulgar Chymiſtry (to which our Shops owe their venal *Spagyrical* Remedies) is as yet very incompleat, affording us rather a Collection, of looſe and ſcatter'd (and many of them but caſual) Experiments, then an Art duely ſuperſtructed upon Principles and Notions, emergent from

from ſevere and competent Inductions, as we have elſwhere endeavoured, more particularly, to manifeſt. And therefore till the Principles of Chymiſtry be better known, and more ſolidly eſtabliſh'd, we muſt expect no other, then that very few vulgar Chymical Remedies ſhould be of the Nobleſt ſort; and that in the Preparation of many others, conſiderable errours ſhould be wont to paſs unheeded; and faults, groſs enough, be apt to be miſtakenly committed. But, of this Subject, we may elſwhere have divers occaſions to entertaine You; and our ſingle Eſſay, *of the Chymical Diſtinctions of Salts*, will perhaps diſcover to You no ſmall miſtakes, in the Preparation of divers applauded Vulgar Medicines. For it is not the Elaborateneſs, but the Skilfulneſs of Preparations, that produceth the Noble Remedies, and a few Teeming Principles well known and apply'd, will enable a man with eaſe to make better Remedies, then a great many Furnaces and Glaſſes, though never ſo well contriv'd, and though very uſeful in their kind. To make out this in ſome meaſure, I ſhall name ſome ſuch Inſtances, as may withall confirm what I formerly deliver'd in this Eſſay, touching the poſſibility and uſefulneſs of Correcting either poiſonous, or otherwiſe very noxious Simples. I never knew *Opium* ſo much Corrected by Saffron, Cinnamom, and other Aromatical and Cordial Drugs (wherewith 'tis wont to be made up into *Laudanum*) nor by the moſt tedious tortures of *Vulcan*, as I have known it by being a while Digeſted in Wine, impregnated with nothing but the weight of the *Opium* of pure Salt of *Tartar*; as we elſwhere more fully declare. (a much nobler *Laudanum* may be made by adding to the *Opium*, inſteed of the Salt, two or three appropriated Simples, and by due Fermentations and Digeſtions of them with it) And for that violent Vomiting Medicine,

by Chymists flatteringly enough, call'd *Mercurius Vitæ*; a whole Pound of Cordial Conserves, or Liquors, will not so well moderate its evacuating force, as the keeping it continually stirring in a flattish and well glaz'd earthen Vessel, placed over a Chafingdish of Coales till it emit no more fumes, but grow of a grayish Colour: which I am very credibly informed to be the Preparation of *Merc-Vitæ purgans*, often mention'd and commended by the famous Practitioner *Riverius*, in his Observations. A not unlike, but far more sudden, Correction of that active Powder, I elsewhere teach. And as for those Operative Minerals, *Quicksilver* and *Antimony*, though long Experience of their churlish and untractable Nature have made many, of the waryer Physitians and Chymists shy to meddle with either of them single: Yet these Concretes, which seem so Incorrigible, may, by being barely (in the gradual Distillation, of Butter of *Antimony*) sublim'd up together into a *Cinnaber*, and then that *Cinnaber* six or seven times resublim'd *per se*, be united into a Medicine, that not only is not wont to work, either upwards or downwards, but of which I have known safely taken, even in substance, to the *Dose* of many Grains; and a few Drachmes, of which, infus'd in a Pound or two of Wine, hath made it of that inoffensive Efficacy (taken, in the quantity of a Spoonful or two, daily upon an empty stomach) That, if it still succeed aswell as we have observ'd it two or three times to do, we may think that our having thus acquainted You with the Vertue of this one unlikely Remedie, (though we have also met with it, even, in Printed Books) may make you amends for all the rest of this tedious Discourse. I once knew a slight (but altogether new and tedious, aswell as Philosophical) Preparation, of Salt of *Tartar* Correct and Tame such Poisons, as ten times the quantity of the highest Vulgar Antidotes,

tidotes, or Cordials, would (I was confident) ſcarce have ſo much as weakned: And I have known by the ſame Prepar'd Salt, dextrouſly Specificated by Simples, the Vertues of ſome Vegetables ſo exalted, That, without any *Cathartique* or *Emetique* Operation, they have (if many Patients, of whom I had caſual opportunities to enquire of the Effects of thoſe Remedies upon them, do not mis-inform me) prov'd more effectual in Tameing divers ſtubborn Diſeaſes, then *Crocus Metallorũ*, *Mercurius Vitæ*, (as 'tis abuſively call'd) and thoſe other dangerous Remedies; which make the Vulgar wont to ſay of Chymiſts, that they quickly either cure their Patients or kill them. And to let You ſee, *Pyrophilus*, by one plain, and yet noble, inſtance; That the knowledge of the Specifick Qualities of Things, skilfully applied to Preparations, may perform, with eaſe, what neither coſtly Materials, nor elaborate Proceſſes are able to effect; Give me leave to inform You; That, whereas, Chymiſts and Phyſitians have not been able by infuſing the true Glaſs of *Antimony* (made *per ſe*) in Spirit of Wine, or the richeſt Cordial Liquors; nor yet by torturing it after ſeveral tedious and artificial manners, to deprive it of its *Emetique* quality, That Vomitive faculty, of *Antimonial* Glaſs, may be Corrected by ſo ſlight a way, as that of Digeſting it with pure Spirit of Vinegar, till the *Menſtruum* be highly ting'd. For if you gently abſtract all the Liquor, and on the remaining yellow or red Powder, you Digeſt well dephlegmated Spirit of Wine; You may after a while obtain a Noble and not *Emetique* Tincture: Of which though *Baſilius Valentinus* preſcribes but five or ſix Drops for a *Doſe*, yet a *Domeſtick* of mine having, out of curioſity, taken to the quantity of thirty Drops at a Time, he found it not at all Vomitive. And this Tincture we the rather mention, Because

See his *Currus Triumphalis Antimonii.*

cauſe, not only, *Baſilius Valentinus*, but other skilful Perſons, highly extol it for ſeveral Diſeaſes.

And let me adde, *Pyrophilus*, (and be pleaſ'd to mark well what I tell you) That by bare reiterated Digeſtions, and Fermentations, there may be Prepar'd, out of many Vegetables, Saline and Sulphureous Eſſences (whoſe Bulk is exceeding ſmall, in proportion to the Concrets whence they are Extracted) which will keep many Years, as I can ſhew you ſome above three Years old, and contain more of the *Craſis* (if I may ſo call it) of the Simple, then the vulgar Vegetable Waters, Spirits, Extracts or Salts, hitherto extant in Laboratories and Shops. But there is ſo great a length of Time required, to the Preparation of theſe Efficacious Juyces, That my ambulatory condition of Life, hath not allowed me to furniſh my ſelf with many of them.

And, *Pyrophilus*, if You will not diſ-believe a Perſon for whom You have ſo juſt an eſteem, as You have for that Ingenious, and Experienc'd, *Monſieur L. F.* who was the French Kings Chymiſt, when You knew him at *Paris*; I can, preſent You with a yet Nobler inſtance, to perſwade You; That, if skill be not wanting, a ſingle Herb, without any violence of Fire, may, by other wayes then are in uſe among Chymiſts, be eaſily enough brought to afford Medicines, endow'd with ſome Nobler Vertues, then any of the moſt compounded, coſtly, and elaborate Medicines, whether Minerals or others, that are to be met with among Vulgar Chymiſt's. This Efficacious part of the Plant, whence 'tis obtain'd, *Paracelſus* call's the *Primum Ens* of the Plant that yeilds it; But though, indeed, I have found the way of Preparing it much plainer, and better deliver'd, then is uſual in his Writings, at the end of his Book *De Renovatione*

novatione & Reſtauratione; Yet I freely acknowledge, That, I ſhould ſcarce have thought it worth the Trial, if it had not been for what the Experienc'd Chymiſt, above mention'd, affirmed to me, upon his own Obſervations, concerning it, partly, becauſe I am not wont to be forward ſo much as to try long Proceſſes upon *Paracelſus*'s credit, and partly, becauſe what he call's *Sal Solutum* ſeem'd to me ſomewhat ambiguous; ſince, in the ſame Page teaching to draw the *Ens Primum* of Gold and *Antimony*, he makes not uſe of Sea-ſalt, but of (a Salt of an incomparably higher Nature) his *Sal Circulatum*; and in the Proceſſe immediatly preceeding ours, to make the *Ens Primum* of *Emeralds*, he Preſcribes the Calcining them in *Sale Soluto*, which agrees far better with his *Sal Circulatum* then with any Solution of Sea-ſalt, which ſeems very unlikely to be able to Calcine and, as he ſayes it muſt, diſſolve *Emeralds*. But the way, that our French Chymiſt told me he uſ'd, was in ſubſtance this: Gather, in a convenient ſeaſon and time of Day, Baulm for inſtance, or ſome other fit Herb, (for experience hath taught, both him and me, that all Herbs are not fit, by this way, to be reduc'd into Liquors) and having beaten it well, in a marble Morter, to a ſoft maſh, plac'd in a Bolt-head hermetically ſeal'd, to Digeſt forty dayes in a Dunghill or ſome analogous heat; then, opening the Veſſel, take out the Matter, which will be far more Liquid then before, from which, having ſeparated the groſſer parts, You muſt Digeſt it in a gentle Bath, that the yet remaining groſſer parts may ſubſide; to which, being filtrated, You muſt, according to him, (for I find not that *Paracelſus* requires it) joyn the fixed Salt, of the groſſer parts above mention'd, dry'd and calcin'd. To this, Prepar'd Liquor, You muſt adde equal parts of the

Liquor

Liquor of good Sea-ſalt well purifi'd, and then melted, and ſuffered to run *Per Deliquium*: This Liquor, being alſo ſeal'd up in a convenient Glaſs, muſt be expoſ'd to the Sun for about ſix Weeks; at the end of which time there will ſwim at the top of it, the *Primum Ens* of the Plant in a Liquid form, tranſparent, and either green or red, or, perhaps, of ſome other Colour according to the Nature of the Plant. And though *Paracelſus* preſcribes but Celandine, and Baulm, to be uſ'd, Yet having enquir'd of our Chymiſt, he told me, he had made ſuch *Prima Entia* of *Scrophularia*, and, as I remember, of one or two other Herbs. But that which makes me thus, particularly, take notice of theſe kind of Medicines, is, That not only *Paracelſus* aſcribes to the *Primum Ens* of Baulm, (or Celandine) the power of renovating them that uſe ſo much of it in good Wine as will give it a Tincture, early every Morning; till, firſt of all, the Nailes of their Fingers, then thoſe of their Toes, afterwards their Hair, and Teeth, fall off, and, laſtly, the Skin be dri'd and exchang'd for a new one: But Your ingenious acquaintance aſſured me ſeveral times, and once, in the preſence of a famous Phyſitian, and another *Virtuoſo*, to whom he appeal'd, as knowing the truth of what he ſayed; That an intimate Friend of his, whom he named to me, having, after the above mentioned manner, Prepared the *Primum Ens* of Baulm, to ſatiſfie himſelf the better of its effects, made the Trial upon himſelf, and took of it, according to the Preſcription, for about a Fortnight; Long before which his Nailes, both of Hands and Feet, began to looſen themſelves from the Skin, (but without any pain) which at length falling off, of their own accord, this Gentleman keeps yet by him in a Box for a rarity, but would not purſue the Trial any further, being ſatiſfied with what he had found,

and

and being in no need of such Physick; But having given of the same Medicated Wine, for ten or twelve Dayes, to a Woman that serv'd in his house, and was neer seventy years of Age, without letting her know, what he expected it should do, Her *Purgationes Menstruæ* came upon her again in a sufficiently great quantity, to fright her so much, that he durst prosecute the Experiment no further. And when I ask'd, why he made no triall upon Beasts? It was answer'd, that though he had but little of the Medicine, yet he put apart an old Hen, and moistning her food with some drops of it for a Week, about the sixth day she began to moult her Feathers by degrees, till she became stark naked; but before a fortnight was past, she began to regain others, which when they were come to their full growth, appear'd fairer, and better colour'd then the first; And he added, That besides that, her crest was rais'd, she also laid more Egges, then she was wont. And as to the *Primum Ens* of the greater *Scrophularia*, by the relater himself, though he ascrib'd not to it any renovating power, as to that of Balm or Celandine, yet he assured me, he had found it enobled, by other great and extraordinary Vertues. But of this kind of Preparation, I might ere now, possibly, have been able to give You a better account, if in my trials about them, I had not met with some unhappy accidents, which I hope my next attempts will escape: which if they do, I may possibly, with an account of them, send You one of some attempts to prepare the like Medicines another and shorter way, together with a consideration, whether *Paracelsus* and others deservedly call such accidents as the abovemention'd change of Nailes Hair, and even of Teeth a reall renovation or rejuvenescence.]

'Tis likewise a way of preparation, differing enough from those that are common among Chymists, which *Helmont* (as

In tractatulo cui titul. *sequuntur Quædam Imperfectiora.*

he saies out of commiseration to the sick) delivers, where he teaches that which he calls the *Via Media* of making the *Elixir Proprietatis*, of which he gives us this commendation: *Hoc medicamine tam Quartanam, quam continuam statim absolvi. Adeò ut qui noctu susceperat sacrosanctum viaticum, & olei extremam unctionem, me in prandio convivam circa lectum habuerit.* And though many think, that he has rather fraudulently, then rightly set the process down; yet experience has invited me to absolve him in this particular. (Though I must tell You, that because a Languid heat is not sufficient to make a Spirituous liquor ascend and circulate as he requires; 'tis not every Chymist, that will, especially in his first trials, avoid the breaking of the Glasses, or at least the burning of the materialls, to which accidents this preparation is very obnoxious, if it be not as well watchfully as skilfully made.) And though for my part, I have scarce us'd this *Elixer* but as a Cordial; yet I know some very expert Physitians, that have given it with great successe in divers difficult cases, and particularly a Friend of the younger *Helmonts* gives it so succesfully, that partly his Patients, and partly others that have try'd it, have sometimes taken of him, at a great rate, whole Pounds in a Year or too; and yet I know by his own confession, that, besides the skill he emploies in making it dexterously, he adds nothing but one Ingredient, to which I confess, I am not apt to ascribe any considerable part of the efficacy of the Medicine; which, when made, he sometimes perfumes by cohobations with Musk, and Amber.

And *Pyrophilus*, that you may not wonder, that I, who think much of *Helmonts* Theory scarce intelligible, and take great exceptions at many things in his writings, should yet now and then commend Medicines upon his Authority, I

must

must here confesse to you once for all, that (alwaies excepting his extravagant piece, *De magnetica vulnerum curatione*,) I have not seen cause to disregard many things he delivers, as matters of fact, provided they be rightly understood; having not found him forward to praise Remedies without cause, though he seem to do it sometimes without measure, and having more then once, either known, or even had, considerable effects of Medicines he commends, which one of the happiest Practitioners I have met with, and one not lavish in extoiling Chymicall Remedies has solemly assur'd me, he has generally, though not alwaies, found more then ordinarily effectual. And upon occasion of this odde preparation of the *Elixir Proprietatis*, I shall adde that, Since Experience shewes us, by what is daily done in Chymicall Laboratories, that upon the operation of the fire upon several Concretes, substances of Nature oftentimes very differing both from the body that afforded them, and from one another, may be obtain'd; as the Oyles, and fixt Salts, even of cold Plants or Hot: Since also, by the mixture of active Bodies new Concretes, endow'd with new qualities, may be produced; as we see that *Saccharum Saturni* emergeth from the conjunction of Lead, with the Acid Salt, distill'd Vinegar; and Since too the same Concrete, according to the differing manners, after which 'tis handled, may acquire differing Qualities, as is clear in the various Medicines, afforded us by Quicksilver, and by Antimony, according as each of them is order'd; I cannot but think, that if Chymistry did no more then assist us, by the resolution of bodies, to extricate their more active parts, and, partly by such resolutions, and partly by associating bodies together, to alter the former texture of Natures Productions, or present us with new Concretes of new Textures; by this

very means, if men want not Curiosity, and Industry to vary and prosecute experiments, there must necessarily arise such a store of new and active Medicines, that in all probability, many of them will be found endow'd with such Vertues, as have not been, at least in that degree, met with in the usuall Medicines, whether simple or compound, to be bought in Apothecary shops; and consequently, even without any notable discovery, or improvement of Principles, Chymists, (even as matters now stand with them) may considerably adde to the Pharmaceutical part of Physick. But if the Operations of Chymistry were seriously enquir'd into, and throughly understood, I make little doubt, but by a skilfull application of them, and especially by a *series* of them, in a rationall and orderly way, succeeding one another, there may be found out a great many preparations of Remedies, both very differing from the common ones, and far more noble then they. And to make this seem probable, I need but repeat some of the examples formerly mention'd; To which I shall adde now, that Experience has inform'd me there is a way, whereby firmer consistent substances, belonging to the bodies of Animals, may without the addition of any extraneous matter, and without any violence of heat, be reduced almost totally into Liquor, and if I much misremember not, these Liquors without any violence of heat, afford their Spirituous and Saline parts, in a very gentle heat, and that before their Flegme. And I must peculiarly inculcate this, That if we had but a few potent Menstruums, to dissolve and unlock bodies with, I scarce know what might not be done in Chymistry. But when I speak of noble Menstruums, I mean not such as work like the generality of Corrosives, and the like Acid or Saline Liquors, which work but upon few kinds of bodies, and soon coagulate, or exantlate themselves by

by working, and thereby become unfit for future operations; but I mean such as either are separable with all their efficacy from the dissolv'd Body; as is said of the *Alkahest*, or such Saline or other piercing Liquors, as not being precisely either Acid, Urinous, or Alcalizate can resolve a great variety of Concretes, without haveing their Vertue, I say not impair'd, but destroy'd thereby; and unlock Minerall bodies, far more then vulgar Menstruums, (as for instance by volatilizing them, or else making them irreducible, or working the like grand changes in them:) and if it be not quite separated from the dissolved Body, is yet so friendly to Humane Nature, as to be free from either fretting, or other such dangerous and offensive Qualities, and rather to be of it self a powerfull Medicine. I should therefore exhort both You, and such other ingenious persons, as wish the advancement of Chymistry, and Physick, (I might possibly adde Natural Philosophy too) to apply their Chymical attempts, chiefly to the finding out of Noble Menstruums, for by being possessor but of one of these, a Man may be able to doe a great number of things, that otherwise are not to be performed; As one of our ordinary Goldsmiths, by the bare knowledg he hath of *Aqua-fortis*, can make many useful Experiments, about Silver, and Gold, that before that Menstruum was found out, all the Men of his profession in the World, were never able in many ages to compass. Nor do I much wonder at that advise, which *Helmont* gives those that aime at the improvement of Physick, in these Words: *Quod si ad istud ignis arcanum non pertingatis* (he was speaking of a prodigious, not to say incredible Liquor) *discite saltem, salem Tartari reddere volatilem, ut hujus medio vestras solutiones perficiatis. Qui etsi sua soluta, anaticè homogenea deserat, digestus in nobis: illorum tamen aliquot vires mutuatus est, quos intra defert, plurimorum morborum*

Helm. *de febr. cap. 5. num. 26.*

Helm. *de febr. cap. 17. vers. finem.*

borum domitrices. For concerning this Salt, he not only elsewhere saies: *Dicam saltem pro ingenuis, quod Spiritus Salis Tartari, si unicornu, argentum, hydrargyrum, lapides cancrorum, vel aliquod è simplicibus dissolverit, neadum febrim, sed & plures affatim morbos sanet, &c.* But in another place he gives us, together with some account of its way of working, this great and comprehensive commendation of it. *Mirum sanè*, saies he, *quantum sal Tartari, vel unicum, volatile factum, non præstiterit: Nam omnem è venis amurcam detergit & obstruentium contumaciam, dispergitque apostematum suscepta conciliabula. De hoc salis (& non olei) spiritu, verum est illud* Paracelsi, *quod quocunq; non attigerit vix alius potentior perveniet.* These passages I should not think worth transcribing and laying together, but that I find that besides the concurrent Testimonies of *Helmont*, *Paracelsus*, and *Basilius* in prase of this Salt, the generality of the more inquisitive Chymists, without excepting the more sober and judicious, do, by the various and painfull, though fruitlesse, attempts they have made to Volatilize Salt of Tartar, conspire in acknowledging it a thing highly worth labouring for; nor do I for my part see (whatever some say to the contrary, and however I have indeed found it more difficult, then perhaps a Novice in Chymistry would think) it should be impossible, for I have more then once with ease enough, made Gold it self volatile, though it be confessed to be the fixest body in the World, and consequently more fixt then Salt of Tartar, which in an open Vessel, may be in time made to flie away by a vehement fire; And I have likewise by an unusual Method, that I have elswhere deliver'd, more then once obtain'd from a mixture of crude Tartar, and two or three Mineral bodies good store of true Volatile Salt, which I could see no just cause not to think afforded by the Tartar.

Helm. *de scholar. Humorista. pass. decept. cap. 2. numero 89.*

But

But I confeſſe this may be rather a volatile Salt of Tartar, then Salt (that is Alcali) of Tartar made volatile, and therefore the principal thing I mention it for, is to ſhew you, that Tartar it ſelf, by an unuſual way of management, may be brought to afford an unuſuall kind of Salt. But this I can tell You, that an ingenious acquaintance of mine, whom notwithſtanding my wonted diſtruſts of Chymiſts, I durſt credit, affirm'd to me, that he had himſelf ſeen a true and real *Sal Tartari volatile* made of Alcali of Tartar, and had ſeen ſtrange things done with it, inſomuch that he believ'd moſt of the things, that *Helmont* delivers of it. For my part I am inclin'd to think, that Salt of Tartar may be made volatile, (whether in the form of a Sublimate or a Liquor) by more wayes then one, though not all of them neer equally good: and whereas one of the beſt (if not the very beſt) of the wayes of volatilizing it, ſeems to do it principally with Spirit of Wine, and the great difficulty of that way conſiſts in bringing this Spirit to aſſociate with the ſalt: I have ſeen Salt of Tartar of my own, brought to that paſſe, which great Virtuoſi have long in vain attempted to bring it unto, namely, to flow readily upon a red hot Iron, and alſo to take fire, and burn with a conſpicuous flame, beſides that when it had been dry'd by a ſmart fire to drive away any parts that did not firmly adhere to it, it would yet readily diſſolve in high rectify'd Spirit of Wine, which you know Salt of Tartar will not otherwiſe do; not to mention the change of its Alcalizate taſte, and other leſſer alterations; but what I can further ſay of this matter, I muſt not declare in this place.

And *Pyro.* That You may not be as many other Virtuoſi, diſcourag'd from labouring for noble Menſtruums, by the confident perſwaſion of many, who believe *Angelus Sala & Guntherus Billychius* (whom I deny not to have been Learned

Men,

Men, but do not take to have been great Masters of Chymicall *Arcana*) fit to determine with Authority, what can, and what cannot be done by Chymistry, least I say You should be, by such mens inconsiderate severitie, brought to despair of ever seeing any noble Menstruum, that is not sharpe to the taste, nor of any of the three peculiar kinds of Saline Liquor. (Acid as *Aquafortis* Urinous, as the Spirits of Blood, Urine, and other Animal substances, nor Alcalizate, as Oyle of Tartar *Per deliquium*) I shall assure you, that to my own knowledg there is in the World a kind of Menstruum, that consists of a pure Chrystalline substance, that is made by the fire, and as truely Saline as Salt of Tartar it self, which strange Salt, though well purified, and readily dissoluble, as well in dephlegmed Spirit of Wine, as common Water, and though it be totably volatile (whence you may guesse of how Saline a nature it is) and also be either way reducible to a noble Menstruum, does really taste sweet; I mean not in the Chymical sense, by want of sowerness (as when they say that the *Calces* of corroded and precipitated things are dulcify'd by frequent ablutions) but by a positive sweetnesse. And whereas the vulgar Saline Menstruums, (which alone seem to have been known to *Sala* and *Billychius*) are so specificated, if I may so express it, that what an Acid Menstruum dissolves, an Alcalizate, or an Urinous will precipitate, *& è converso*; And whichsoever you choose of these three sorts of Menstruums, one of the other two will disarm, and destroy it. I found by trial, not only that a Red Tincture of Glass of Antimony, being drawn with a Menstruum that was but a degree to this Liquor, I could not precipitate it like our common Tinctures, either with Spirit of Urine, or an Alcalizate Solution. But that (which is far more considerable) though it would readily mix with Acid Spirits

Spirits, as Oyle of Vitriol, with Volatile and Urinous Spirits, as Spirits of Urine it self, and with Alkalizate Solutions; yet would neither of these three make any Ebullition at all with it, or seem to work at all upon it. But of such Matters no more at present.]

CHAP. IX.

YOu will perhaps expect, *Pyrophilus*, that, Treating of the advantages that may accrew to the Therapeutical part of Physick, from a more accurate knowledg of Natural Philosophy; I should tell you with the Chymists, that Chymistry it self, and much more Physiology in its full extent, is not only capable of improving the Pharmaceutical part or Preparation of Remedies; (for, that we have confessed already) but also of affording us a new and much better *Methodus medendi*, or skill of using the Helps, that Nature or Art hath provided against Diseases. And indeed the Physitians Art is so difficult, and a man must know so many things to be, though not tolerably, yet perfectly skilld in it, that it may without disparagement to Physitians, be thought yet capable of being improved, if not of being reformed. *Hippocrates* begins his Aphorismes with a complaint, that Life is short, but the Art long. And *Paracelsus* himself, though he say after his boasting manner, *Ars est longa, vita brevis, ubi autem donum finis* (as he speaks) *est, ibi ars est brevis, vita verum longa si arti conferatur*: Yet expounding the same words a little above, he saith, *Itaque* Hippocrates *meritò de eo conqueritur: nam & assectis ipsius idem accidit: Ars medica consistit in Philosophia, Astronomia, Alchymia & Physica, meritò igitur dici potest Artem esse longam. Multum enim requiritur temporis, ad quatuor has Columnas Medicinæ dis-*

 cendas

scendas & perscrutandas. *Celsus*, who hath been stiled *Hippocrates Latinorum* doth more then once call Physick a *Conjectural Art*, as particularly in that place where he saith, *Est enim hæc ars conjecturalis, neque respondet ei plerumque non solum conjectura sed etiam Experientia.* And well might these great men acknowledg their Art to be difficult, since the two Instruments (as *Galen* calls them) of finding Arts, being Judgment and Experience *Hippocrates* gives this Character of them; ἡ μὲν πεῖρα σφαλερὴ ἡ δὲ κρίσις χαλεπή. And that Experience may be uncertaine without the Theory of Physick, he that so much builds upon Experiments, *Paracelsus* himself seems to confess where expounding those words of *Hippocrates*, he saith, *Hoc modo se habuit: Medicina in Principio, ut nullam Theoriam habuerit, sed solum Experientiam hoc laxare, hoc constipare, quomodo autem & cur, id ignoratum fuit: ideo unus salvatus est, alter perditus, nunc autem,* &c. And concerning the Critical part of Physick (to allude to *Hippocrates* his expression) *Galen* who exercised his reason so much about it tells us, that *Per rationem judicium haud quaquam facile existit, sed, si quid aliud, maximam habet difficultatem.* And to confirm the difficulty of finding the best way of employing reason to the cure of Diseases, not only by the Authority of *Galen*, but his Arguments; Let me inform you, that after having told us how difficult a thing, and how rarely to be found is that reason, which considers, and determines what on every occasion is to be done, *Neque enim* (addes he) *si veritas esset inventu facilis, tot ac tanti viri in ea quærenda occupati, in tam contrarias sectas fuissent unquam dispertiti.* And *Paracelsus*, whatever he often elsewhere boastingly affirmeth of himself, yet handsomely enough both expresseth and confesseth the difficulty of being a good Physician, in one of his Prefaces to the Students of Physick,

Lib. 2. c. 6.

In Præfatione, Lib 1.

In Commentar Aphoris. 2.

sick where he saies, *'Non Titulus, non Eloquentia, non Linguarum peritia, nec multorum Librorum lectio (& si hæc non parum exornant) in Medico considerandæ, sed summa rerum ac Mysteriorum cognitio, quæ una facile aliorum omnium vices agit. Rhetoris quidem est diserte posse loqui ac persuadere atque judicem in suam sententiam trahere. Medici autem affectuum genera, causas ac συμπτώματα novisse, & iis insuper sagacitate ac industriâ Pharmaca applicare, atque pro cujuslibet ingenio ac ratione vel cunctis mederi:* But though, *Pyrophilus*, after the acknowledgments made by such great men of the almost insuperable difficulty of their Art, you would perhaps think it no great presumption, if a man should attempt to innovate in any part of it, and consequently even in the *Methodus medendi:* Yet *Pyrophilus*, I am much too young, too unlearned, and too unexperienced, to dare to be dogmaticall in a matter of so great moment. And the Physitians are a sort of men, to whose Learned Writings on almost all subjects, the Commonwealth of Learning is so much beholden, that I would not willingly dissent from them, about those notions in their own profession, wherein they seem generally to agree; And do very much disapprove the indiscreet practise of our common Chymists and Helmontians, that bitterly and indiscriminately raile at the Methodists instead of candidly acquiescing in those manifest Truths, their Observations have enricht us with, and civilly, and modestly shewing them their Errors where they have been mistaken. And yet, *Pyrophilus*, Since divers of the eminentest Methodists themselves have more then once ingeniously acknowledged to me, and seriously deplored with me, the incompleatnesse of their Art, (which perhaps made (that Learned Prince) the Late King tell them, that they were at best but good guessers) and since about divers particular diseases we

Paracelsus in his Preface to his *Bertheoza*, or *Chirurgia Minor.*

have obſerved, the Method of ſome of the moſt reputed Doctors in *England* (which yet, I think, is at this day as well ſtored with Learned Men of that profeſſion, as any part of *Europe*) not only very differing, but repugnant to each other; I ſuppoſe we may without diſreſpect to their profeſſion, diſſent from the moſt of them about thoſe caſes, about which they are reduced to diſagree ſo much among themſelves. And it would be worth an impartial diſquiſition, whether, ſince the *Methodus medendi* ought to be grounded on and accommodated to the Doctrine of Diſeaſes, the new Anatomical diſcoveries formerly mention'd, and others not yet publiſh'd do not by innovating divers things in *Pathology*, require ſome alterations & amendments in the *Methodus Medendi?* But in this particular, I dare yet affirme nothing, and therefore ſhall proceed to obſerve to you, that the unuſual efficacies of new remedies, may probably make the Method of curing more compendious, becauſe (as I lately alſo intimated) one Medicine may be ſo richly Qualified, as to anſwer ſeveral intentions, which in the common way, require diverſity of Helps and Remedies. Thus, for inſtance in the Cure of the Kings-Evil, by the received Method, the Phyſitian muſt propoſe to himſelf ſeveral ſcopes (ſuited to ſeveral indications) and proſecute them ſucceſſively with diſtinct and appropriated Remedies. But I have (as I formerly alſo told you to another purpoſe) known a ſingle Specifique Simple, given only in ſmall Beer, in not very many daies, without any ſenſible Evacuation, waſt the peccant humor, appeaſe the pains (which before were very great) and diſcuſſe the unbroken Tumours, and heal the broken ones. Thus, according to the known Method, the great Remedy in Pluriſies is copious Blood letting, which is ſtrictly preſcribed even to Aged perſons and teeming Women, by the famouſeſt

ſeſt of our Practitioners, and, I confeſs, not irrationally, where the Phyſician is furniſht but with vulgar Remedies: and yet by ſome *Helmontian* Medicines, we have known Plurifies cured even in young men, without Phlebotomy, and our ſelves ſome while ſince made a ſucceſful trial of that Nature in a young Gentleman not unknown to you, which I mention not, with *Helmont*, to reject or ſo much as to diſparage *Phlebotomy* in this diſeaſe (for ſo it be moderate and ſeaſonable Experience ſhewes it frequently proves uſeful) nor as if we had obſerved all *Helmonts* boaſted Remedies (though for the moſt part good ones) to be conſtantly ſucceſful; but to give you an inſtance of the truth, of what I was ſaying before, That new and more generous Remedies may ſo far alter the received *Methodus Medendi*, as to make divers of its preſcriptions unneceſſary. Of this truth, *Pyrophilus*, another inſtance might be afforded us by the Rickets, a new and abſtruſe Diſeaſe, at leaſt as is ſuppoſed, and ſometimes ſo ſtubborn, that one of the famouſeſt Phyſicians in *Europe*, (whom I think I need not name) hath not been able of late to cure it in ſeveral of his own Children. And yet I ſuppoſe you may have heard that Excellent Perſon your Mother, ſeveral times mention her having performed divers cures (ſome of them improbable enough) of this Diſeaſe, barely by that ſlight preparation of *Colcothar*, lately taught you, and preſented Her by us; And by which (we having made and diſtributed, at Her deſire, a conſiderable quantity of it) ſeveral other Perſons have freed Children from that diſfiguring Sickneſs: Of which, but few Moneths ſince, your little Couſin *D.* being ſick almoſt paſt hope, vvas a while ſince brought out of danger, by Gods bleſſing upon ſome of the ſame Remedy, wherewith we preſented her Mother, together with our perſwaſions to try it on her own Child, as ſhe had

had ſucceſfully done on the Children of divers others. And yet this Remedie (to adde that upon the By, in favour of ſomething to be ſaid anon) works almoſt inſenſibly, ſave that in many bodies it is, eſpecially at firſt, diaphoretique. And this property of that Remedie minds me to adde, that it would not be amiſs for Phyſitians, to conſider whether or no (However, Bleeding, Purging, Vomiting, Iſſues, Gliſters, Scarifications, and thoſe other painful wayes of Evacuation be not (however Chymiſts are too bitterly and unreſervedly wont to reject them) to be altogether condemned and laid aſide, yet) there may not in ſome particular diſeaſes and bodies be found more gentle, and yet effectual waies of diſcharging Nature of that which offends her, then thoſe painful and debilitating ones, which we have mentioned (without the uſe of one of the chief of which namely *Phlebotomy* we ſee that almoſt all kind of Diſeaſes are cured in Children.) The contributing to render the waies of Cure leſs painful and weakning, would gratifie ſo great a part of thoſe who may need Phyſick, that I hope you will eaſily pardon my ſpending ſome Pages to that purpoſe. I conſider then, that oftentimes the peccant matter, though very offenſive by its qualities, is much leſſer then is ſuppoſed, in quantity, and might, if we were but Maſters of Specifique Remedies, either be breathed out by inſenſible tranſpiration, or carried off by Sweat or Urine, without tormenting, or weakning the Patient, by thoſe other copious Evacuations of groſſer Matter, which are alwaies troubleſome and painful enough, though not alwaies effectual: Nay that even in Chirurgery it ſelf, if thoſe that practiſe it were as knowing as Nature has been bountifull, there would not be ſo often a neceſſity as 'tis commonly ſuppoſed there is of mutilating or tormenting the Patient to recover him. You cannot doubt, unleſs

less You will denie what *Gulielmus Piso* affirmes, upon his own Observation, of the Cures done by the illiterate Indian *Empericks*. The passage You have seen already; But to it he adds so notable and ingenious an acknowledgment, that I cannot but honour him for it, and be willing to make way for the Credibility of a good part of what we are hereafter to deliver, in this discourse, by premising it. *Immo* (continues he) *ex venenatorum fungorum aliorumque toxicorum esu, solo potu infusi recentis radicis Jaborandi in instanti à letho vindicatos, me aliisque Galeni Nepotibus haud parum pudore suffusis, post tot alexipharmacorum & theriacalium Antidotalium irritos conatus. Ita ut postea ejusmodi collegas barbaros subinde mihi adjungi passus sim, non adeo quidem nostratium valetudinem ad tactum arteriarum moderari quam dictis modis consilii copiam præbere solitos.* Thus farre he: Which premis'd, let us proceed to consider, more particularly, some of the less painful wayes of freeing men from Diseases.

CHAP. X.

THat great Cures may be done by bare outward Applications, You will scarce deny, if you dis-believe not the Relations which are made us, by Learned Men, concerning the Efficacy of the *Lapis Nephriticus*, only, bound upon the Pulses of the Wrist's (chiefly that of the left Hand) against that stuborn and anomulous Disease *the Stone*: And that which gives the more credit to these Relations is, That not only the Judicious (a) *Anselmus Boetius de Boot* seems to prize it, but the Famous *Monardes* professeth Himself not to write by Hear-say, of the great Vertues of this *Indian* Stone, but to have made tryal of it Himself upon persons of very high Quality:

Franciscus Bernius, Donzellinus, Ernestus Burgravius, *who commend it upon their own experience, besides very many that commend it in general termes.*

(a) De Lapid: & Gemmis *lib:* 2. *cap:* 11.

Quality: And that which is related by (b) *Monardes* is much less strange, then those almost incredible things which are with many circumstances delivered of that Stone, by the Learned Chymist (c) *Untzerus*. And although it must be acknowledged, That some Stones, that go under that name, have been ineffectually applied in *Nephritick* Distempers, Yet the accurate *Johannes de Laet* Himself, furnisheth us with an Answer to that Objection, informing us that many of those *Nephritick* Stones (which differ much in Colour, though the best are wont to be greenish) although not at all Counterfeited, or Sophisticated, are of little or no Vertue. But that yet there are some others of them which can scarce be distinguished from the former, but by tryal upon *Nephritick* persons, which are of wonderful Efficacy, as he Himself hath more then once tryed in his own Wife. *Garcias ab Orta* (*lib*: 1. *cap*: 53.) mentions a Stone, found in *Balagat*, call'd *Alaqueca*; of which he tells us, That though it be cheap, *Hujus tamen virtus* (to use his own words) *reliquarum Gemmarum facultates exuperat, quippe qui sanguinem undiquaque fluentem illico sistat.* *Monardes* (*cap*: 35.) relates the great Vertues of a Stone against Hysterical Suffocations, and concludes, *Cum uteri Suffocationem imminentem præsentiunt, adhibito lapide subito levantur, & si eum perpetuo gestant (Hysterici) nunquam simili morbo corripiuntur, exempla hujusmodi faciunt ut his rebus fidem adhibeam.* The same Author in the next Chapter, treating of the *Lapis Sanguinaris*, or Blood Stone, found in new *Spain*, (having told us, that the *Indians* do most confidently believe, that if the Flesh of any Bleeding part be touched with this Stone, the Bleeding will thereby be stanched) adds this memorable Observation of his own, *Vidimus nonnullos hæmorrhoidum fluxu afflictos remedium sensisse, annulos ex hoc lapide*

(b) Nicolaus Monardes de simpli: Ind: Histor: *Cap: seu Tit*: 20.

(c) De Nephrit: *lib*: 1. *cap*. 24. *where he hath nine or ten Observations which he calls* Observationes raræ & inauditæ de Lap: Nephritico.

De Gem: & Lapidibus *lib*. 1. *cap*. 23.

lapide confectos in digito continue geſtando; nec non & Menſtruum fluxum ſiſti. And of the formerly mentioned *Lapis Porcinus*, the Experienced *Bontius* (having mentioned how the *Indians* give the Wine wherein it hath been ſteeped, againſt the Diſeaſe called *Cholera*; which is as much and as juſtly feared, by the Iſlanders of *Java*, as the Plague is in *Holland*) adds this memorable paſſage, *Prægnantibus tamen hic lapis non bene datur; nam abortum provocare adeo certum eſt, ut fœminæ Malaicæ mihi retulerint ut ſi quando Menſtrua eorum purgatio non bene procedat, ſi ſaltem hunc lapidem manu geſtent juvamentum ſe inde ſentire.* And the relations, *Pyrophilus*, that I may in another place preſent You with, concerning the wonderful Stone, formerly mentioned, with which your Grandfather performed ſuch eminent Cures, (particularly of the Stone in the Lord of *Falkland*, then Deputy of *Ireland*, and others, to whoſe Backs it was applyed) will, I ſuppoſe, make You the more readily give credit to the Relations of the Authors we have newly mention'd. What *Monardes* mentions of the Vertue of the *Lapis Sanguinaris*, to Cure *Hæmorrhoidal* Fluxes, puts me in mind of a yet much ſtranger thing, which *Helmont* affirmes, namely, That he could make a Mettal, of which, if a Ring were worn, the pain of the *Hæmorrhoids* would be taken away, in the little time requiſite to recite the Lords prayer; and within twenty four Hours the *Hæmorrhoids* themſelves, as well internal as external, how protuberant ſo ever, would vaniſh, and the reſtagnant Blood would (as he ſpeaks) be received again into favour, and be reſtored to a good condition. The ſame Ring he alſo commends in the ſuffocation and irregular motion of the Womb, and divers other Diſeaſes: But if *Paracelſus* be in any caſe to be credited in an unlikely matter, We may think, by his very ſolemn Proteſtations,

Helm. de Febr. *cap.* 2.

 that

that he ſpeaks upon his own experience; That he had a Ring made of a Metalline ſubſtance, by him called *Electrum*, (which, by his deſcription, ſeems to be a mixture of all the Mettals joyn'd together under certain Conſtellations) which was of far greater Vertue then this of *Helmont*; For, *hoc loco* (ſayes he) *non poſſum non indicare admirandas quaſdam vires virtuteſque electri noſtri, quas fieri his noſtris oculis vidimus, adeoque cum bona veritatis conſcientia proferre atteſtarique poſſumus. Vidimus enim hujus generis annulos, quos qui induit, hunc nec ſpaſmus convulſit, nec Paralyſis corripuit, nec dolor ullus torſit, ſimiliter nec apoplexia, nec epilepſia invaſit. Et ſi annulus hujuſmodi Epileptici digito annulari, etiam in paroxyſmo ſaviſſimo, inſertus fuit, remittente illico paroxiſmo, æger à lapſu illico reſurrexit. &c.* But to take notice of ſome other outward Remedies. To our preſent Theme belongs that noble Cure, performed by the Famous and experienced *Fabritius ab Aquapendente*; who tells us, That he Cured a man of a *Scirrhus Lienis*, and a Dropſy, by the long uſe of Sponges, moiſtned with ſtrong common Lime Water, and then expreſſed and worne upon the Spleen; notwithſtanding the Muſcles of the *Abdomen*, and all the other parts that ly betwixt the applyed Spong and the part affected. And to this we may adde, the ſtrange Cures mention'd by *Kircherus*; and confirmed to me, by a Learned Eye-witneſs, to be frequently performed of very dangerous Diſeaſes, in that Cave, neer *Rome*, where the Patients being expoſed ſtark naked, and tyed Hand and Foot, upon Beds of Straw; and being by the *Sulphureous* vapour of the place and ſometimes their own fear, caſt into a ſweat, are lick'd well by a great number of peculiar kind of Serpents that inhabit that *Grotta*. Moreover, We oftentimes ſee Agues Cured by Amulets and Applications

Paracelſ. in Archidox Magic. *lib.* 5.

De Operat. Chirurg *p.* 1. *cap.* 51.

to the Wrists. And I my self was, about two Years since, strangely Cured of a violent *Quotidian*, which all the wonted Method of Physick had not so much as abated, by applying to my Wrists a mixture of two handfuls of Bay-Salt, two handfuls of the freshest English Hops, and a quarter of a Pound of blew Currants very diligently beaten into a brittle Mass, without the addition of any thing moist, and so spread upon Linen Cloth and tyed about the Wrists. And with the same Remedies (which yet we have observed sometimes to fail) have divers others been cured, both of *Quotidian* and *Tertian* Agues: Nay an Eminent Physitian gave me, lately, thanks for the great Effects he had found of it, even in continual Feavers.

And here, *Pyrophilus*, I shall not scruple to acquaint You, with my having sometimes wished, That Physitians had been a little more curious to make Observations and Tryals of the distinct Operations of various Bodies outwardly applyed. For I consider that, in some of them, the subtle Corpuscles, (which seem to insinuate themselves into the Pores of the Body, and into the Mass of Blood, with little or no alteration) have much the like Operations with the Body whence they exhale, taken in at the Mouth. As we see in some Preparations of *Sulphur*, which have like Vertues, inwardly given and outwardly applyed; and more manifestly in *Cantharides*, which I have found, by external application, to work strangly upon the Bladder, as that they excoriated it when taken into the Body; & yet more manifestly in *Quick-silver*, which by inunction may be made as well to Salivate, as if it were swallow'd down. And an eminent Physitian lately complain'd to me, That washing a Childs scabby Head with a Decoction of Tobacco, to kill and dry up the Scabs, the Boy was made thereby both

ſick and drunk: And Learned Men aſſure us, That, by ſome *Catharticks* outwardly applyed, thoſe may be purg'd that will not ſwallow Phyſick. But other Medicines there are, which, before they get into the Maſs of Blood, are much alter'd; either in ſtraining through the Fleſh and Membranes of the Body, or in the Digeſtions they paſs through in the Stomack, and elſewhere: And theſe may have very differing Effects, inwardly given and outwardly applyed; as, in the formerly mention'd inſtance of Hops, Currans and Salt, neither any of the Ingredients inwardly given, nor the mixture hath been (that I know of) noted for any Febrifugal Vertues. So likewiſe Turpentine and Soot that inwardly taken are good for quite other Diſeaſes, (as Pluriſies, and Obſtructions of the Kidneys) outwardly applyed are the main Ingredients of *Pericarpiums*, extoll'd againſt Agues. And *Mille-folium* or *Yarrow*, beſides the Vertues it hath inwardly againſt Diſeaſes of quite other Natures, being worn in a little Bag upon the tip of the Stomack, was (as Himſelf confeſſ'd to me) the Secret, againſt Agues, of a great Lord, who was very curious of Receipts and would ſometimes purchaſe them at very great Rates; And a very famous Phyſitian, of my acquaintance, did ſince inform me, That he had uſed it with ſtrange ſucceſs. I know alſo a very happy Phyſitian, who aſſures me, That he hath very often cured, both in himſelf and others, the Chilblains when they come to be broken, by barely ſtrowing on the ſore parts the fine powder of Quinces thinly ſlic'd and dryed. And who knows what unexpected Operations divers other Bodies may have, when outwardly applyed, if various Trials of that Nature were skilfully made; eſpecially, ſince we ſee that (for reaſons elſewhere to be conſidered) ſome Bodies ſeem to have quite contrary Operations, when outwardly

wardly applyed and inwardly taken. For we see that Spirit of Wine does, in several cases, allay the inflammation of the external parts, which given inwardly, would quickly inflame the body. And our often commended *Piso*, speaking of a choise Remedy for those Distempers of the Eyes, that used to trouble Men in *Brasil*, addes, *Idem quoq; præstat manipahera, ex radice Mandihoca, quæ licet pota venenosa habeatur* (as we formerly noted out of his and other Testimonies) *oculis tamen prodest, visumq; emendat.* And if the Simples, to be outwardly applied, be skilfully prepar'd, That may much vary and improve their operations. As we see that Vitriol, which is made of Copper, or Iron corroded by, and Coagulated with Acid Salts, hath outwardly divers Vertues which crude Copper has not, either outwardly or inwardly. And Gold Dissolved in *Aqua Regis*, and precipitated vvith Oyle of *Tartar*, is invvardly, as far as I can discover, gently Purgative; yet the same *Aurum fulminans* being calcin'd vvith tvvice or thrice it's weight of Flovvers of Brimstone, till the *Flores* be burnt away, is known to be much commended by Chymists, and others, for a Diaphoretick. But though, as to any outward Vertues of the same Powder, Physitians and Chymists are wont to be silent, yet probably it may have very great ones, as well as quite differing from those it has, being taken at the Mouth. For I know a Person, that being grievously tormented with exulcerated *Hæmorrhoides*, a very expert Chymist of my acquaintance, not knowing what else to do, applied to the part affected, an Oyntment consisting onely of *Aurum fulminans* prepared and fixed by a slight and familiar way (which you may command) and made up with a little Oyle of sweet Almonds, into a requisite consistence; and though presently upon the application of the Remedy, the pain for a quarter of an

Houre

Houre hugely increaſed, yet ſoon after it abated, and the Hemorrhoids the next day were cloſed, and the day after went away; Nor has the Patient ever ſince (that is, for ſome Years) been troubled with any thing of Relapſe. And the ſame Phyſician aſſures me, that with the like Remedy he has found a ſtrange effect in Venereal Ulcers. And perhaps to this may be referred what has been found by ſome friends of mine, that Phlegm of Vitriol, and *Saccharum Saturni*, which not only inwardly given are ſaid much to cool the Blood, but outwardly applied are good for Burns and hot Humours, do yet potently diſcuſſe cold Tumours. But leaſt you ſhould ſay, that this diverſity may proceed (at leaſt in part) from the Corpuſcles of differing Natures, that may be imagined in the forementioned Medicines; I ſhall return to what I was diſcourſing of before, and take notice of the Efficacy of ſome other external Remedies.

[Since the beginning of this ESSAY, I ſaw a luſty and very ſprightful Boy, Child to a Famous Chymical Writer, who, as his Father aſſur'd me and others, being by ſome Enemies of this Phyſitians, when he was yet an Infant, ſo bewitcht that he conſtantly lay in miſerable torment, and ſtill refuſing the Breaſt, was reduc'd by pain and want of food to a deſperate condition, the experienc'd Relater of the Story, remembring that *Helmont* attributes to the *Electum Minerale immaturum Paracelſi* the Vertue of relieving thoſe whoſe diſtempers come from Witchcraft, did according to *Helmonts* preſcription hang a piece of this Noble Mineral about the Infants Neck, ſo that it might touch the Pit of the Stomack, whereupon preſently the Child, that could not reſt in I know not how many Daies and Nights before, fell for a while a ſleep, and waking well, cry'd for the Teat, which he greedily ſuck'd, from thenceforth haſtily recovering,

ring, to the great wonder, both of his Parents, and several others that were astonish'd at so great and quick a change. And though I am not forward to impute all those Diseases to Witchcraft, which even Learned Men Father upon it; yet its considerable in our present case, that whatsoever were the cause of the Disease, the Distemper was very great and almost hopeless, and the cure suddenly perform'd by an outward application, and that of a Mineral; in which compacted sort of Bodies, the finer parts are thought to be more lock'd up.]

Among the proofs of the efficacy of appended Remedies, we must not pretermit the memorable Examples, that are deliver'd by the Judicious *Boëtius de Boot*, concerning the Vertues of that sort of *Jasper*, which is blood red throughout the whole Body of the Stone, nor being mingled with any Colour: *Testari possum* (saies he) *me, qui alias lapidibus & geminis tantas vires, quantas vulgus solet, non tribuo credibile vix, de Jaspidis viribus, observasse. Nam cum ancilla fluxu menstruorum ita laborasset per aliquot dies, ut nullo modo sisti posset, Jaspidem rubram impolitam & rudem femori alligari jussi. Alius (in eadem Domo) cum in pede vulneratus esset, nec sanguinis fluxus cohiberi posset, admoto lapide, extemplo impeditus fuit, licet vulnus non tegeretur.* To these he adjoynes a much more memorable Example, of a Maid he cur'd at *Prague*, who had been for six Years sick of an Hemorrhagy so vehement, that there scarce ever pass'd a Week, in which she did not several times Bleed, neither could she be reliev'd by any Remedies, though she had long us'd them, till she was quite tired with them; wherefore our Author setting them all aside, lent her a *Jasper*, of whose Vertues in such cases he had made good trial, to hang about her Neck, which when she did, the flux of Blood presently ceas'd, and she afterwards

De Lapid. & Gem. l. 2. cap. 102.

wards for curiosity sake, oftentimes laying aside the Stone, and as often as she needed it, applying it again, observ'd, That whereas the flux of Blood did not presently return upon the absence of the *Jasper*, but after divers Weeks, yet upon the hanging it on again it would presently be stopt, so that she could not ascribe the relief to any thing but the Stone, by which our Author tells us, that at length she was quite cur'd: And speaking of the praises given by others to Green *Jasper* speckled with Red, he concludes, *Sed ego, quod multoties expertus sum, refero.* But amongst the Operations of outwardly appended Medicines, I have scarce met with a stranger then that which the Experienc'd *Henricus ab Heer*, mentions in the fourteenth of those Observations which he truely stiles *Rare*, namely, That a Woman, who had by an unskilful Mid-wife the Bladder Lacerated, and thereby been subject to a perpetual *Incontinentia Urinæ*, and had been reduc'd constantly to wear a Silver Pipe, was perfectly help'd, by wearing, as a Gypsie had taught her, a little Bag hung about her Neck, containing the Powder made of a live Toad, burnt in a New Pot: Which relation I the rather mention, not only because the Author having try'd the Remedy upon a Merchant, to whom an unskilful Lythotomist had left the like Disease, found it presently to succeed; But because having been very desirous to have further trial made of so odd a Remedy, by a curious Physitian, he lately gave me this Account of it, that though in one or two it had fail'd, yet having given some of the powder to an inquisitive Person, known to us both, he assur'd him it had succeeded in two or three, (and the Disease is too unfrequent, to give occasion to have the Remedy often tried) And the Physitian adds, that one of those Patiens tels him, (the Physitian) That though her infirmity were occasion'd by a *Laceratio Vesicæ*, yet the Remedy

In observa. Medic. oppido rarisf. pag. 194.

yet the Remedy helps her as long as she wears it about her, in case she renew the Powder, when the Vertue of it begins to decay: but that (which is remarkable to our present purpose) if she leaves it off awhile, she findes the Disease return. The same *Henricus ab Heer*, among his freshly commended Observations, hath another of a little Lady, whom he concludes to have been cast into the strange and terrible Distemper, which he there particularly Records, by Witchcraft. Upon so severe an examination of the Symptoms made by himself, in his own House, that if, notwithstanding his solemn Professions of veracity, he mis-relate them not, I cannot wonder he should confidently impute so prodigious a Disease to some supernatural cause. But though the Observation, with its various Circumstances, be very well worth your perusing; yet that, for which I here take notice of it, is, what he adds about the end of it, concerning his having cured her, after he had in despair of her Recovery sent her back to her Parents, by an outward Medicine, namely, an Ointment which he found extoll'd against Pains produc'd by Witchcraft, in a Dutch Book of *Carrichter*'s: (where also I remember I met with it set down a little differently from what he delivers) Of which wonderful Ointment, the Ingredient that he found so extreamly difficult to procure, namely, The Misseltoe of Hazel, being in *England* not so rare, but that I have more then once got it, and found it, as he intimates, very green, and (what he mentions not) extreamly bitter, I could wish that those that have the opportunity would make tryal. For besides what *Carrichter* delivers, and our Author relates of it, a Learned Physitian did highly commend it to the Judicious *Gregorius Horstius*. And though, if we allow it to cure bewitch'd Patients, the vertue that may be in external Remedies, will be made so much the more

conſpicuous; yet ſuppoſing the Diſeaſes to be, though ſtrange, yet but natural, we cannot but allow that there may be a wonderful efficacy in an outward Remedy, ſince it was able, onely by anointing the Joints, and thoſe pained parts with it, to cure a radicated Diſeaſe, attended with ſuch wonderful and horrid Symptoms. And after this it may ſeem but little, what elſe would appear a ſtrange thing, which *Helmont* affirms of a Plaiſter he had, wherewith he tells us, That he ſafely cur'd hundreds of *Quartans*, even Autumnal, without relapſe: elſewhere he ſaith, That he made this Plaiſter, for by the Circumſtances I preſume he means no other, *of a few reſolving and abſterſive things*; and adds, That it never fail'd him, but onely that in fat Perſons it ſucceeded more ſlowly. And yet in theſe, and the like ways of curing Diſeaſes, though approv'd, if not alſo commended, by eminent Phyſitians both Ancient and Modern, there is no ſenſible evacuation made of peccant Humors, which perhaps materially remain in the Body, and may, by the *Effluvia* of theſe Remedies, be deprived of their former Qualities, and made ſo far obſequious to nature, that ſhe is able, if need be, to eaſe her ſelf of them by Sweat, Urine, or undiſcerned tranſpiration.

Helmont, de febr. cap. 14. *verſ. finem.*

Cap. 17. *in fine.*

And that the peccant Humors remaining for awhile materially in the Body, the Diſeaſe may ſometimes be removed, may appear by the Cures which we ſee now and then performed of Agues by ſuddain frights; by which no diſcernable evacuation is made of Humors, though probably ſome conſiderable change be thereby produced in the temper of the maſs of Blood, or in the Texture of the Morbifick Matter: (as Phyſitians call it) As ſeems probable both from divers other things mention'd here and there in this Eſſay, and particularly from the lately recited Paſſage of *Helmont*, where he

he takes notice of the rectifying of the peccant, and, by Nature, rejected Blood, without any ſenſible evacuation upon the wearing of His Ring. I knew a Gentleman, a ſtrong and a reſolute Man, who had been long a Souldier, and attained the higheſt ſort of Military Employments; notwithſtanding which, he was ſtrangely fearful of Rats, and could not endure the ſight of them: This Gentleman, having been long troubled with an obſtinate *Quartan*, and travelled with it into ſeveral Countries, without being able to finde any Cure for it, coming at length accidentally and ſuddenly into a place where a great Rat was in a corner, whence he could not flie from the Gentleman, he furiouſly leap'd upon him (yet without biting him) and thereby put him into a fright, which freed him from the Ague that had ſo long importuned him. And the experienced *Salmuth* tells us a pleaſant Obſervation, of one who was cured even of the Gout by a fright. For this Man having his Feet and Hands covered with a Poultis, made of Turneps, Flower and Milk, and being left in his Chair in a low Room, was, whil'ſt his Servants were all gone into the Garden, aſſaulted by a Sow, who finding the Door open, and invited by the ſmell of the Cataplaſm, came to devour it; and ſtriving to do ſo, flung the ſick Man and the Chair to the Ground, and put him into ſuch a fright, that our Author tells us, That that very Day his Pains decreaſed, and continued leſſening by degrees, till at length they wholly left him, without ever returning to trouble him again. There are divers Inſtances that diſcover what great changes may be produced in the Body, without taking in any thing viſibly at the Mouth. And on the other ſide a good Air alone doth often, in Conſumptions and other Diſeaſes, perform what hath in vain been expected from the uſe of emptying Phyſick. It were to be wiſhed that we

Obſerv: cent. 1. Obſerv. 48.

had, among our *European* Physitians, the Physick Books of those of *China*; For though our Doctors are much more Learned Men then theirs, yet probably their Writings and their Practise may teach us something that is new, and something making for our present purpose. For the famous Jesuite *Semedo* informs us, That the Books of our Physitians having not yet been brought to *China*, they are instructed in their Art by abundance of their own Writers; and that though in their practise they do not let Blood (as the Learned *Varenius* tells us, That neither do the *Japonian* Doctors) or set Cupping-glasses, though they use no Syrrups, nor Potions, nor any Issues, but are onely Herbarists, using nothing but Herbs, Roots, Fruits, Seeds, *&c.* yet *Physick* (to use our Authors Words) *is in a very good condition in China.* (as *Almeida* also tells us, That the Physitians are much esteemed in *Japan*) And of the skill of some of the *Chineses* in that Art, he gives us in the same Chapter some considerable Instances. And though, as we said it is very likely that their Doctors are much inferior, in point of Learning to ours, yet it is considerable, that in so vast, so civiliz'd, and so poulous a Countrey, Physick can be practised with reputation, without the use of those Evacuations which are here so frequently made by Phlebotomy, Potions and Issues. Nor should we onely expect some improvement to the *Therapeutical* part of Physick, from the Writings of so ingenious People as the *Chineses*; but probably the knowledge of Physitians might be not inconsiderably increased, if Men were a little more curious to take notice of the Observations and Experiments, suggested partly by the practise of Midwives, Barbers, old Women, Empericks, and the rest of that illiterate crue, that presume to meddle with Physick among our selves; and partly by the *Indians* and other barbarous

History of *China*, *part.* 1. *chap.* 12.

[*NB*]

Medicinæ faciendæ mediocrem habent peritiam.—Ægris falsa, acria, & plura proponunt, dicente Maf.o, pisces & conchylia Pharmaca suavia & odorata.

[NB] *Sanguinem nunquam eliciunt, Magnam Medicorum dignitatem videre est ex Epistola Almeidæ ubi narrat, &c.* Bern: Varenius, in Descript: Regn: Japon. Cap. 25.

rous Nations, without excepting the People of such part of *Europe* it self, where the generality of Men is so illiterate and poor, as to live without Physitians. For where Physick is practised by Persons that never studyed the Art of it in Schools or Books, many things are wont to be rashly done, which though perhaps prejudicial, or even fatal to those on whom they were tryed, may afford very good Hints to a Learned and Judicious Observer: Besides, where the Practitioners of Physick are altogether illiterate, there oftentimes Specificks, may be best met with. For such Persons, being wont, for want of skill in Physick, and particularly the Art of mixing Simples, and in that of varying their Remedies according to Circumstances, do almost wholly rely upon Specificks; whose Vertues, from their practise, may be sometimes better gathered, then from that of skilful Physitians, in regard that those Empericks (besides, that they assist not with any skill in the *Methodus medendi* the vertues of their Remedies) are wont, for the Reasons newly mention'd, to try obstinately, and to the uttermost, the effects of their few specificks. And the nature of their Medicines may be the better known, in regard they are not wont to blend them, as Learned Men but too often do, with many other Ingredients, whose Mixture, as we formerly noted, either alters their nature, or makes it difficult to determine (as *Galen* himself in a like case confesseth, *Nam ut verum fateamur hæc difficilis quoq; res est & rara inventu cùm post multa remedia adhibita ægro tanti quod ex iis in causa fuisse dicitur ut melius pejusve habeat*) whether the effect be to be ascribed to what is given for the specifick, or to some other of the Ingredients, or to the whole Compound as such. The experienced *Bontius*, in his excellent little Tract *De Medicina Indorum*, doth more then once confess, That it is very undeservedly that the *Europe-*

Gal: in Aphor: Hipp. Comment. 1.

ans

Lib. 2. Dialog: 7. *ans* look upon the *East Indians* as *Barbarians*. And even of those among them, that are ignorant of other things, he hath this Passage, *Hinc etiam fit quod homines cæteris rebus idiotæ tam exactam herbarum & stirpium nanciscantur scientiam ut si vel Doctissimus Pawius, nostri ævi Botanicorum princeps è mortuis resurgens huc veniret, miraretur se ab hisce hominibus barbaris doceri posse.* And *Linschoten* in his Voyages, speaking of that Famous Mart of the *East Indies*, the City of *Goa*, where the Viceroy and the Arch-Bishop resided, and he himself lived: These Heathenish Physitians (saith he, mentioning those of *Goa*) do not onely cure their own Nation and Country-men, but even the *Portugals* also; for even the Viceroy himself, the Arch-Bishop, and all the Monks and Fryers, do put more trust in them then in their own Country-men, whereby they get great store of Money, and are much honored and esteemed. I have not now the leisure to acquaint you with what I might alledge, to confirm this truth out of the practises of the illiterate Natives of some not yet sufficiently civiliz'd parts of *Ireland*, and the Inhabitants of some other places where Physitians have not yet setled: But I shall minde you of the Confession of *Celsus*, where speaking of Physick, *Hæc nunquam* (saith he) *non est: siquidem etiam imperitissimæ gentes herbas aliaq; prompta in auxilium vulnerum morborumq; noverunt.* And I wish that other Learned Men would imitate the commendable example not onely of *Prosper Alpinus*, who Writ a Treatise *De Medicinâ Ægyptiorum*; and of *Jacobus Bontius*, in his *Medicina Indorum*, but of *Gulielmus Piso*, who hath lately presented the World with the rude ways of curing, used by the *Brasilians* themselves, in his new and curious Books *De Medicina Brasilienſi*, in the beginning of the second of which, he much confirms what we have been delivering, in the ensuing

Voyages chap. 84.

Preface, Lib. 1.

ing Paſſage: *Quemadmodum multa in tam craſſa Barbarie cruda vel corrupta arteq; Hippocraticâ indigna reperiuntur; ſic etiam non pauca utiliſſima antiquitatem redolentia: quæ vel eruditiſſimos medicos ad urnas medicinæ ſubjiciunt, obſervanda occurunt. Quippe cum multarum Artium rudimenta vel ab ipſis Animantibus brutis (quibus benigna mater Natura arte inſita imprimis curandis morbis deſtitui noluit) ad nos redundare fatendum ſit; Quis dubitet ab his mortalibus, licet remotiſſimis à dogmaticâ & rationali medendi arte, non plurima nobiliſſima at ſecreta remedia atq; antidota, medendi morbos veteribus incognitos quotidiè ad poſteros derivari? quibus paulatim ad manum traditis & tandem quaſi in ſuccum & ſanguinem à rationalibus converſis doctorum ſcholæ & libri ſuperbiunt?* And to this agrees very well that grave ſaying of our experienc'd *Harvey*, to the very Learned Doctor *Ent*: *Nulla gens tam Barbara eſt quæ non aut fortuitò, aut inevitabili quadam neceſsitate coacta, aliquid in uſum communem adinvenerit quod Nationes alias humaniores latuit.* Nor ſhould we diſdain the Remedies of ſuch illiterate People, onely becauſe of their being unacquainted with our Theory of Phyſick. For though I will not ſay, as the old Empericks wittily enough did in that Paſſage of *Celſus*, *Requirere etiam, ratio idem doceat quod experientia, an aliud? Si idem ſupervacuum eſſe, ſi aliud etiam contrarium.* But leſt we ſhould, by too great reliance on the *Galenical*, or other ancient Opinions, neglect uſeful Remedies, becauſe preſented by Perſons that ignore them, and perhaps too, hold Opinions contrary to them, I ſhall leave you to conſider what is in the Perſon of the ſame Emperical Sect, repreſented by *Celſus*, where having ſpoken of the darkneſs of the cauſes of Things, and the uncertainty of the Theorems of Phyſick: *Ac nihiliſtas cogitationes* (ſaith he) *ad Medicinam pertinere, eo quoq; diſci, quod qui diverſa de*

Piſo de Medic: Braſ: Lib: 2. Cap: 1.

Georg: Ent in Epiſtol: præfix: Exercit Harvei de Gen: Animal:

Celsi præfatione ad Lib. 1.

de his senserint ad eandem tamen sanitatem homines perduxerint. Id enim feciſſe, quia non ab obſcuris cauſis neq; à naturalibus actionibus, quæ apud eos diverſæ erant; ſed ab Experimentis, prout cuiq; reſpondeant, medendi vias traxerint, ne inter initia quidem ab iſtis quæſtionibus deductam eſſe medicinam ſed ab Experimentis, &c. For though this Sentence aſcribes too little to reaſon, yet there is ſomething in it that deſerves to be conſidered: Eſpecially ſince we obſerve not that the late Anatomical Diſcoveries of the motion of the *Chyle* and Limphatick Liquor, by formerly unknown ways, in newly detected Veſſels, hath yet made Men cure Diſeaſes much better then before. Not that I think that Anatomical and Pathological Diſcoveries will not, in proceſs of time (when the *Hiſtoria facti* ſhall be fully and indiſputably made out, and the Theories thereby ſuggeſted, clearly eſtabliſh'd) highly conduce to the improvement of the *Therapeutical* part of Phyſick; but yet this Obſervation may make it the more reaſonable to beware of relying ſo much upon the yet diſputable Opinions of Phyſitians, as to deſpiſe all Practiſes, though uſually ſucceſsful, that agree not with them: For of ſuch our Author ſpeaks well, *In omnibus ejuſmodi cogitationibus in utramq; partem diſſeri poſſe, itaq; ingenium & facundiam vincere: morbos autem non eloquentiâ ſed remediis curari; quæ ſi quis elinguis uſu diſcreta benè nôrit, hunc aliquanto majorem medicum futurum quam ſi, ſine uſu, linguam ſuam excoluerit.* And *Paracelſus* ſpoke well too, if he ſpoke truly, when in one of his Prefaces, ſpeaking to thoſe whom he invited to hear him expound his Books of Phyſick and Chyrurgery at *Baſil*, *Illos tamen* (ſaith he of the formerly mentioned Books) *non aliorum more ex Hippocrate aut Galeno, aut quibuſlibet emendicatus, ſed quos ſumma rerum doctrina, experientia atq; labore aſſequut us ſum, proinde ſi quid probaturus*

rus experimenta, ac ratio, auctorum loco, mihi ſuffragantur.

It would, *Pyrophilus*, I fear, be tedious to trouble you here with all that I have met with in good Authors applicable to my preſent ſubject, and the Deſign I have been proſecuting in favor of external Remedies: But yet one Paſſage there is, which doth ſo notably confirm what we have deliver'd, as well touching the Efficacy of ſimple Medicines, as the great cures that may, in divers caſes, be perform'd by outward Applications, that I muſt not here omit the mentioning of it, as I find it in the Epiſtle Written out of *Peru* to the inquiſitive *Monardes*, in theſe words: *In urbe Poſto, ubi aliquot annis vixi, omnis generis morbos Indus quidam curabat ſolo cujuſdam Plantæ ſucco artubus & parti affectæ illito. Ægros deinde ſtragulis egregiè tegebat ad ſudorem provocandum: Sudor è partibus illitis emanans, merus ſanguis erat, quem lineis pannis abſtergebat, atque ita in curatione pergebat, donec ſatis ſudaſſe putaret, optimis interea cibis eos alens. Eo Remedio multi morbi deplorati curabantur, imò ægri juniores & robuſtiores ab ejus uſu fieri videbantur; ſed neq; pretio, neq; precibus, neq; minis unquam efficere potuimus, ut eam plantam nobis demonſtraret.*

Petrus de Oſma in Epiſt. ad Monard. quæ exſtat. in libello de ſimplicibus medicamentis ex Occidentali India delatis.

CHAP. XI.

BUt, *Pyrophilus*, beſides ſuch external Medicines as work after the manner of thoſe I have heretofore mention'd, we may poſſibly without abſurdity, provided we do it without credulity, enquire, Whether there may not be a ſort of others that operate, in a more wonderful and extraordinary way? And it would not perhaps be altogether unworthy the Experiment, to try whether or no, there may not ſometimes be performed, ſuch cures as are wont to paſs, either for

Fabulous or Magical; some of them being to be done without exhibiting, or applying any thing immediatly to the Patient, and others by some such unknown wayes as those which Chymists call, either Magnetism, or Transplantation: such as are the cures reported to be perform'd by the Weapon-salve, and Sympathetick Powder, and such as is that cure of the Yellow Jaundice (mention'd with some variation by *Paracelsus*) wherein seven or nine cakes (for it must, forsooth, be an odde number) are made up with the newly emitted and warm Urine of the Patient, and the Ashes of Ash-wood, and buried for some daies in a Dunghil. For it is not only by the easie and superstitious vulgar, that the possibility of performing such cures, by transplantation, or some other Magnetical way (as they are pleas'd to call it) hath been believed; For within the compasse of my own slender reading, I find that divers Eminent Physicians, have both made use of, and commended Magnetical Remedies.

What is to be thought of the Sympathetick Powder; I confesse I am as yet in doubt, but however I shall take this occasion to inform you, That a very honest Gentleman, whom his Pen has made known to a great part of the Learned Men, and Virtuosi in *Europe*, complaining often to me, that though he were much troubled with, that sad disease, the Stone in the Bladder, yet he was more incessantly tormented with an Ulcer he had in the same part (all the searching Medicines that he took to dissolve, as he hop'd, the Stone, exasperating the Ulcer:) I one day advis'd him to make trial of the Powder of Sympathy, upon some of the Ulcerous Matter he voided with his Urine; the Remedy being such, as if it had a Magnetick Virtue, might do him good, and if it had none, could not prejudice him; a while after, I receiv'd both from him in a Letter, and from his

Physitian.

Physician very great thanks for the advice, the Patient having since the use of the Powder, been eas'd of the distinct pain he was put to by the Ulcer, and this relief lasted, if I misremember not, above a Year, and how much longer I know not. But I shall not insist either upon this, or upon the Testimonies and Relations of *Paracelsus*, *Helmont*, *Goclenius*, *Burgravius*, nor even the modern Roman Doctor *Servius*, nor any of the other Authors that do professedly take upon them the defence of the Weapon-Salve, by reason of what we have elsewhere to Write to you, by way of Examination of that Salve, and the Sympathetick Powder, though I deny not in some Trials, I have found them unavailable; Yet besides what I have newly related, I have seen sometimes something follow upon the use of the Symathetick Powder, that did incline me to think, that sometimes it might work Cures. But I shall alleadg something of more unsuspected credit, and first *Dominicus Panarola* now Professor of Physick at *Rome* in his newly divulged *Fasciculus Arcanorum* presents us two instances to our present purpose, in these words. (*Mira* (say's he) *quotidie reperiuntur in Medicina ad confirmationem operis quod Doctißimus Physicus, Petrus Servius* (the same we lately mentioned) *complevit de unguento armario, sciendum est, quòd petia sanguine imbuta sub cineribus calidis posita menses sistit experimento pluries comprobata: quin etiam Magister meus Petrus Castellus* whose name his late Anatomy of the Civet Cat, and other Writings have made Famous) *ajebat se expertum fuisse Hemorrhoides, si tanganter tuberosa radice Chondrilla, siccari, si Chondrilla siccetur; corrumpi vero si corrumpatur: quapropter sub Camino exsiccanda ponitur, post hujusmodi tactum Chondrilla tuberosa.* The Learned *Salmuth* in his Observations furnishes us with an Example of a most violent pain of the Arme, removed by

Panarola Fasc: Arcan. 1.

Centur. 3. *Observat.* 34.

Transplantation: They did beat up Red Corals with Oaken leaves, and having kept them on the part affected, till suppuration; they did in the Morning put this mixture into an Hole bored with an Auger in the Root of an Oak, respecting the East, and stopt up this Hole with a Peg, made of the same Tree, from thenceforth the pain did altogether cease, and when they took out the Amulet, immediately the torments returned sharper then before. A great and excellent Lady (a near Kinswoman, *Pyrophilus*, of yours and mine) and very far from credulous, confess'd to me, as did her servants also, that with the above mentioned Remedie of Ashes and Urine, she was not only once cured of the Yellow Jaundice, by a Friend of hers that had observed, that she had been fruitlesly vexed by a Tedious course of Physick, prescribed by the famousest Doctor then in *England*; but that afterwards relapsing into that same Disease she had cured her self by the same Remedy. I remember, that being some years since brought almost to the brink of the Grave by a suddain effusion of Blood within my Body, from which without a signal mercy of God, I should not have recovered, among other men skilled in Physick that came to assist me, in that danger, I was visited by a Galenist of much repute, whose pale looks inviting me to enquire what it was that ailed him, he answered me, That he had not long before been desperately sick of an obstinate *Marasmus*, which notwithstanding all the Remedies he could use, did daily so consume him, that he appeared but a Skeleton, whereupon having found the uneffectualness of ordinary Remedies, and being hopeless of being relieved by them, he resolved to try a Sympathetick Medicine, which I remember my self to have met with in *Hartman*. He took then an Egge, and having boiled it hard in his own warme Urine, he with a Bodkin perforated

rated the shell in many places, and then buried it in an Ant-hil, where it was left to be devour'd by the *Emmets*, and as they wasted the Egge, he found his distemper to lessen, and his strength to encrease, insomuch that he now conceived his Disease to have quite left him.

The Experienc'd *Riverius* in his last Observations (newly publish'd since his Death) has two notable Examples to our present purpose: For (*a*) first, he tells us, that the eldest Daughter of a great Officer in *France*, was so tormented with a *Paronychia* for four daies together, that the pain made her passe the night sleepless; whereupon having by *Riverius* his order, put her Finger into a Cats Eare, within two houres she was deliver'd from her Pain, and her whole hand, which before was Tumid, unswell'd again; except the Finger, which it self was out of Pain. (*b*) The other case was of a Counsellors Wife, who by the same Remedy was cured of a *Panaritium* (which had for four daies vex'd her) in a much shorter time then the other, namely within a quarter of an Houre. But that which chiefly makes these stories pertinent to our present occasion, is this notable Circumstance, that in both these cases, the Cat was so manifestly put to pain, that *Riverius* thought it had attracted to it selfe the morbifick matter from which it freed the Patient; For in the former of these two cases, the Cat loudly complain'd of the pain he felt, and in the other, was, in that short time the cure was in performing, put to so much pain in his Eare, that two men were hardly able to hold him fast, he struggl'd so forcibly. And these two relati ns of *Riverius*, may, though there be some disparity in the cases, give some countenance to what might otherwise be distrusted in the Observations of the Industricus (c) *Petrus Borellus*, where he saies, *Podagra mirè levatur, si catelli cumpodagrico recumbant, morbum enim contrahunt*

(a) *Riverii Cent.* 4. *Obser.* 62.

(b) *Riverii Cent.* 4. *Observ.* 19.

(c) *In Historiar. & Observ.* 3. *Medico-physicar. Cent.* 3. *Observ.* 28.

hunt adeo ut vix incedere queant; Æger verò levamen susci-pit. Which perhaps he may have been induced to write by the story that goes of, that odde Chymist, *Robert Fludd's* having transplanted the Gout of one of his Patients, by making him often sleep, with a Dog that was fond of him, who thereby became afterwards subject to such periodical fits of the Gout, as the Master had been troubled with.

[And since I begun this Chapter, and met with these Observations, discoursing of this matter with a judicious person, well skill'd in Physick, and whom his learned Writings have made Eminent, He told me, that he had not very many Months since, seen a Cure by Transplantation, perform'd on the Son of one that was wont to make Chymical Vessels for me: and because the Observation is considerable, that there might be no mistake in it, he was pleas'd to set it me down in writing (attested with his annexed name) which enables me to present it you in his own words, namely: *N. N.* of *N. Potter,* had a Sonne, who was long sick of the Kings Evil, which swell'd much, and broek into sores at last, which he could by no ordinary means heale. The old Man had then a Dog, which took an use of licking the soares, which the Dog continued so long, till he wasted the very kernels of the Ulcers that were knit in with the Veins, and perfectly cur'd the sore, but had the swelling transplanted to himself, so that he had hereupon a great swelling, that arose and continued on his Throat. The Lad was hereby freed, and so continu'd to be till 1660, and for ought I know, is so this day. This I saw being there at that time to view the Clayes, and bespeak Retorts of the old man. *]

* *Some years since the present* ESSAY *was written, I lighted on the 66th Observation of the industrious* Bartholinus 3 Century, *and the* 53 Observation *of his* 6 Century, *in both which places giving instances of the Transplantation of Diseases he mentions, besides some of those Examples deliver'd by us, divers others; for which I am willing to refer you to the alledged places, only in the last of those* Observations *delivering something as upon his own knowledg (which he does not in the rest of the instances.) that much confirmes what we have mention'd concerning* Fludd. *We shall annex it in his own words.* In Catello Milesio

Avi nostri materni, quem jam alit in ædibus suis Avunculus meus suspiciendus *M. Jacobus Finch-ius Phys P.P.* & Academiæ nostræ senior, evidentius hæc patuit trahendi facultas. Colico dolore torquebatur Avunculus, Canis ventri impositus quum incaluisset, urgebat exitum, vomuit vehementer et Tormina colica Avunculi remiserunt. Ancilla ejusdem in dolore dentium eundem canem genis apposuit, sensitque levamen, sed canis dolorum impatientia hinc inde cursitare et latrare. Idem expertus est scriba in Colli Tumore.

And

And to confirm the credibility, as well as increase the number of our magnetical waies of cure; I shall adde, That Sr *Francis Bacon* himself Records, with great solemnity, his own having been freed, not only from very many new warts, but from one almost as old as he, by a piece of Lard, with the skin on it, which after having rub'd upon them, was exposed out of a Southern Window to putrifie. And therefore, though the vanity and superstition of most of the Authors that speak of Magnetick Remedies, and the impertinent circumstances, that are usually prescribed, as necessary to their effectualness, do generally, and justly enough, make sober men despise, or at least suspect such unlikely waies of cure; yet in consideration of the instances lately produced (to which we may perhaps elsewhere adde some others) and because divers men, as well Physitians as others, have seriously assured me of their having been some of them eye-witnesses, and others p rformers of such cures; I am apt to think it fit, that, a severe indeed, but yet further trial be made of Physical Experiments of this kind. And I cannot but commend the curiosity of Dr *Harvey*, who, as rigid a Naturalist as he is, scrupled not often to try the Experiment mentioned by *Helmont*, of curing some Tumors or Excrescencies, by holding on them for a pretty while (that the cold may throughly penetrate) the Hand of a man dead of a lingring disease; which Experiment, the Doctor was not long since, pleased to tell me, he had sometimes try'd fruitlesly, but often with good successe. Nor doth the grand Objection against such Experiments, namely, that such or such a person, having once made trial of them, found them not succeed, seem at all to me, alone, of weight enough to make such Experiments, or those other improbable ones formerly mentioned, totally rejected: Because, that if they really

Centur. X. *Exp.* 997.

really do ſometimes ſucceed, though ſometimes they chance to fail, yet that poſſibility of their ſucceeding may ſufficiently evince, that there are really in Nature Medicines that worke after that extraordinary manner. And I ſee no reaſon, why it ſhould be more required of thoſe Medicines, that work at a diſtance from the Patient (or at leaſt are not taken at the Mouth, or injected otherwhere) only by ſubtle *Effluvia*, that they ſhould alwaies cure, then it is exacted of vulgar Remedies, from which we might reaſonably expect more conſtant effects, becauſe of their being either inwardly given, or more immediately or at leaſt more durably applied to the Patient. And if Rubarb be, juſtly affirmed to be an excellent medicine in Looſeneſſes, though we daily in *Ireland* ſee many ſwept away of thoſe diſeaſes, in ſpight of the uſe of Rubarb and Mirabolans, with other aſtringent Remedies to boot: And if quikſilver be, not unreaſonably, by moſt of our Phyſitians eſteemed, and employed as an effectual Remedy againſt Venereal Diſeaſes, becauſe it ſometimes removes them; though *Fernelius*, *Montanus*, and many other Learned Authors tell us, as they ſay upon their own experience, that (though it often palliate thoſe diſtempers) it very ſeldome cures them: Nay, and if Diaphoreticks are ſtill eſteemed ſuch by the generality of Phyſitians, though few Sudorificks will cauſe ſweat in all bodies, and ſcarce any in ſome bodies, I ſee not, why theſe Remedies, that work, as it were, by Emanation, may not deſerve the name of Medicines, if they ſometimes unqueſtionably ſucceed, though they ſhould not alwaies prove ſuccesful ones; Nor why they ſhould, notwithſtanding their ſometimes not ſucceeding be laid aſide, eſpecially ſince theſe ſympathetical wayes of cure are moſt of them ſo ſafe and innocent, that, though, if they be real, they may do much good, if they prove fictions they can do no harme,

(unleſſe

(unleſſe by accident, as in caſe the Patient ſhould ſo ſingly rely on them, as to neglect (which he need not) all other helps to recover.)

CHAP. XII.

BUt you will now perhaps demand, *Pyrophilus*, how the Naturaliſt, as ſuch, can contribute to the Credit or Advancement of the mentioned ways of curing Diſeaſes, without the wonted weakning and painful Evacuations? In anſwer to this Queſtion, I muſt put you in minde, That it would be no new thing for Naturaliſts, not profeſſedly Phyſitians, to treat of this ſubject; and that the Naturaliſt may afford good Hints to the Practitioner of Phyſick, both upon divers other accounts already touch'd upon, and by trying on Bruits variety of hitherto untryed Medicaments or Remedies, and by ſuggeſting to him both the Events of ſuch Tryals, and alſo what hath been already obſerved about the cures of the Diſeaſes incident to Beaſts. For though (as we formerly told you) there are ſome things that are not equally Poyſonous, as others not equally Safe, to Man and to *ſome* Bruits; yet there are other Beaſts, eſpecially Dogs and Monkeys, whoſe Bodies are, by many Poyſons, affected almoſt like thoſe of Men: And ſince according to the old Rule, *Periculum faciendum eſt in vili animâ*, many things may be very well tryed on ſuch Creatures, that we dare not at firſt venture to try on Men. We may give Dogs Poyſons, onely to try the Vertue of our Antidotes; and we may give them Wounds, to make tryal of the efficacy of the Weapon-ſalve and Sympathetick Powder: Since divers of my Friends (as I have intimated above) aſſure me, That they have ſome of them ſeen, and others perſormed cures of Horſes, lam'd by pricking, by ſticking the Nails that hurt

them into the Weapon-salve; which for that very use, among others, some of them are wont to carry about them in Silver Boxes. When Oxen, and such-like Cattle, are troubled with that Disease which makes them continually turn about in one place (and is therefore called *The turning Evil*, or *Sturdy*) a common Remedy here in *England*, as Grasiers that make use of it inform me, is to cast down and tye fast the sick Beast, and then to open his Skull a good way (or, if need be, take off a round piece of it over the place supposed to be affected) and at the open place to take out a little Bag or Bladder, which is usually found to lye near the Membranes of the Brain, and to be full of Water and Blood, and then leisurely to heal up the hurt: And this cure is much commended, as both common and easie, by our experienced *Markham*. In Goates likewise, that are much subject to the Dropsie, the Husband-man ventures to slit, and let out the Water under the Shoulder. And divers hazardous Operations in Chirurgery, such as are Arteriotomy, the Exsection of the Spleen and other parts, were, or should have been first attempted upon Bruits, and then practised on humane Bodies. And in imitation of these, 'tis likely that divers other Experiments, of good use in Chirurgery, may be discovered for the relief of Man, without Endangering him in prosecuting such Discoveries. And to say nothing of the known practice of splaying Swine and Bitches; In the Neighborhood of a Country House of mine, in the West of *England*, and probably in divers other parts, some experienc'd Shepheards have an odde way of castrating male Sheep, especially Lambs, when they are grown so old that 'tis thought dangerous to geld them the common way. A Servant of mine that deals much in Cattle, and had lately divers Sheep swigg'd (as they call it) after this manner, tells me that is thus done: The Beast, on whom the Operation is to be performed,

ed, being held by a ſtrong Man with his Belly upwards, another ſtrong Man draws a ſtring, as firmly as he can (tying it with a knot or two, to prevent its yielding or ſlipping off) about the Teſticles, as if he meant by drawing that ſtring, to cut them off; and then anointing the part with a little freſh Butter, or ſome ſuch like thing, he lets the Ram goe to feed; which for the moſt part (notwithſtanding the anguiſh of this Ligature) he will begin to do in a ſhort time: And within two or three days, the Teſticles being, by the ſtrict Ligature, denyed the Nutriment and Spirits that were wont to be conveyed to them will grow ſo rotten as either, together with the ſtring, to fall off, or be very eaſily pull'd off, ſometime ſtinking very rankly like Carrion. And even among thoſe things that are already practiſed by Farriers, Shepherds and Graziers there are many ſuch things as we have newly mentioned, which may ſerve either to enrich or illuſtrate the way of curing humane Bodies: Their ignorance and credulouſneſs, together with the liberty and meaneſs of thoſe Creatures they phyſick, gives them leave to venture on any thing, having made them try upon Horſes and Cattle, many ſuch things as Phyſitians dare not try upon Men and Women. And among thoſe many extravagant things, ſome, as it oftens happens, have ſucceeded ſo proſperouſly, as to deſerve to be conſidered by the skilfulleſt Phyſitians; Some of whom might, without diſparagement to their Profeſſion, do it an uſeful piece of ſervice, if they would be pleaſed to collect and digeſt all the approved Experiments and Practices of the Farriers, Graziers, Butchers, and the like, which the Ancients did not deſpiſe, but honored with the Titles of *Hippiatrica* and *Veterinaria*: And among which, if I had leiſure, divers things may be taken notice of, which might ſerve to illuſtrate the *Methodus medendi*. As to give you but

one Instance which lately occurred to me, The Usefulness of letting Blood in some cases, Which is so severely condemned by many Chymists, and the efficacy of a small, if seasonable, Evacuation, which can scarce be conceiv'd to do more then alter the course of the Blood, may be illustrated by the Staggers in Horses, and the Cure of it. For I have seen a Coach-horse, ready to drop down dead of his Disease upon the High-way, by having his Gums rubb'd with the Coach-whip till the Blood appear'd, relieved almost in a moment so much, that though he were not well able to stand before, yet he was immediatly able to go on, and draw the Coach with his fellows.

CHAP. XIII.

THe next thing we are to observe to you, *Pyrophilus*; and on which its nature and importance will engage us somewhat long to insist, is this, That the Handling of Physical matters was Antiently thought to belong to the Naturalist; as we are clearly informed by the judicious *Celsus*, in that memorable Passage, where speaking of the *Origin* of Physick, *Primo* (saies he) *medendi scientia Sapientiæ pars habebatur; ut & morborum curatio & rerum naturæ contemplatio sub iisdem Authoribus nata sit: Scilicet his hanc maxime requirentibus, qui corporum suorum robora, inquieta cogitatione nocturnaq; vigiliâ, minuerant.* He adds, that many of the Professors of Philosophy were skilful in Physick, especially *Pythagoras*, *Empedocles*, and *Democritus*, and that *Hippocrates* (whom some think to be the disciple of this last nam'd) was the first who severd Physick from Philosophy, and made it a distinct Discipline, And this Apologie for the ensuing discourse being thus premised to it, I shall further Answer, that

Celsus in Præfatione Lib. 1.

that I ſhould perhaps be obliged to exceed the limits of an ESSAY, if I ſhould in this Diſcourſe inſiſt on every thing, upon whoſe account the Naturaliſt may aſſiſt the Phyſitian, if he be barely a *Medicus* to cure Diſeaſes, which that you may the more readily believe, I ſhall Select and proſecute ſome of theſe things in the remaining part of this ESSAY.

And firſt I ſhall repreſent to you on this ſubject, That the account upon which Phyſitians are wont to reject, if not, deride the uſe of ſuch Specificks, as ſeem to work after a ſecret and unknown manner, and not by viſibly Evacuating peccant humours (or by other ſuppoſedly manifeſt qualities) being generally this, That they ſee not how the promis'd Effects can well be produced by Bodies, that muſt work after ſo peculiar and undiſcerned a manner; This being, I ſay, the great thing that hinders Phyſitians from endeavouring to find, or, ſo much as, being willing to make uſe of Remedies of this ſort, the Naturaliſts may do much towards the removal of this Impediment, by ſhewing out of ſuch things as may be met with or performed within the Macrocoſme, That ſuch, or at leaſt as ſtrange operations as are aſcrib'd to theſe Specificks, are not without Example in Nature; and conſequently ought not to be rejected, barely as being impoſſible. And indeed the Phyſiologie, wherewith Phyſitians as well as others are wont to be imbu'd in the Schools, has done many of them no ſmall Diſſervice by, accuſtoming them to groſſe apprehenſions of Natures wayes of working. Whence it comes to paſſe, that not a few ev'n Learned Doctors will never expect, that any great matter ſhould be performed in Diſeaſes, by ſuch Remedies as are neither obvious to the ſence, nor Evacuate any groſſe, or at leaſt ſenſible matter. Whereas, very great alterations may be wrought

wrought in a Body, especially if Liquid, as is the Blood and peccant Humour, without the Ingresse or Egresse of any visible matter, by the intestine commotion of the parts of the same body acting upon one another, and thereby acquiring a differing Motion, Location (if I may so speak) or Figure, which, with the other Qualities and Effects resulting thence, may alter the motion and Texture of the Liquor, and thereby produce great changes in the Body that Harbours it. How much an unperceiv'd recesse of a few subtile Parts of a Liquor may alter the Nature of it, may be gues's'd at, by the obvious change of Wine into Vineger; wherein upon the Avolation (or perhaps but the misplacing) of so little of the Spirituous and Sulphureous part, that it's Presence, Absence, or new Combination with the other Parts is not discernable to the Eye, the scarce decreased Liquor, becomes of a quite differing Nature from what it was. And though in *England* this Degeneration be not wont to be so suddenly perform'd by reason of the coldness of the Climate, yet in hotter Countries the change is much more speedily made. As in *Brasil*, the above mentioned *Piso* informes us, that the expressed Juice of the Suger Canes, which by Coction, and farther ordering, would be certainly brought to Suger, will of it self keep sweet but about four and twenty Houres, and then begin to sowre, and be altogether unfit to make Suger of, though very fit to turne into good Vinegar. And this I find confirm'd by a Modern and applauded *French* Writer in his Description, of some parts of the West *Indies*, inhabited by his Nation: And relations of the same sort, concerning the hasty sowring of some other Liquors in *America* I have had from our *English* Travellers and Planters. And in the East-*Indies*, *Linschoten* tells us of a change much more suddain: For speaking of the formerly men-

Lib.4.Cap.10.

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tion'd *Sura* or Liquor, afforded by the wounded *Coco-tree*. The ſame Water (ſayes he) ſtanding but one Houre in the Sunne is very good Vineger, and in *India* they have none other. And that even very hurtful Liquors (and why not then ſome peccant matter in the body?) may after the like manner change their Nature may appear by what we have formerly mentioned, and is unanimouſly affirm'd by credible Writers of ſeveral Nations, concerning the juice of *Mandioca*, which being Poyſon, when it is firſt expreſs'd do's in a few houres by Fermentation, purge its ſelfe and looſe its pernicious Nature. That alſo by the bare Ingreſſe of ſome Subtile and not viſible Matter, ſuch inteſtine Commotions may be excited in Liquors, may appear by the ſowring which has been often obſerved upon great Thunders to happen, not onely to wines, but to other Vinous Liquors alſo, as I lately received from a great Maſter of variety of Liquors, a complaint that by ſome Thunder, which happen'd here a few weeks ſince, almoſt all the Beer and Ale in the neighbourhood was ſpoil'd. And I remember, that when I return'd out of *Italy* thorow *Geneva*, there happen'd in that place an Earthquake, upon which, the Citizens complaind, that much of their wine was ſowr'd, though I that lodg'd in the higheſt part of the Town, ſaw nothing to make me believe, that the bare Succuſſion of the Earth was capable to produce ſo great and ſuddain an alteration in the Wine.

Chap. 56.

See Piſo *lib.* 4.

That ſuch inviſible Corpuſcles may paſſe from *Amulets*, or other external Remedies into the Blood and Humours, and there produce great changes, will ſcarce ſeem improbable to him that conſiders how perſpirable according to *Hippocrates* a living body is, and that Vegetable and Animal Body's, whoſe Texture is more looſe and open, may well be ſuppoſed to ſend forth Expirations, ſince even divers Minerals are found

found to do the like; as may appear by the odorable ſteames of rub'd Brimſtone, and Amber, by the Corpuſcles, which performe the Magnetick Operations, by the Emetick Quality imparted to Liquors by the Glaſſe of Antimony, and by *Crocus Metallorum* barely infus'd in them, without ſenſibly looſing any thing, either of their bulk or weight; and by the vertue of killing Wormes, wherewith Wine, and even Water has been, not only by *Helmont*, but by divers other Phyſitians obſerved to be enrich'd, after a Quantity of *Quickſilver* has been for ſome Houres ſhaken in it, though without any ſenſible deperdition of the ſubſtance of the *Mercury*. And indeed I have ſomewhat wondred that many Learned moderne Phyſitians, either out of an affected Severity, or perhaps Animoſity againſt Chymiſts, overlook or even deride all operations of this Nature; Since I remember *Galen* himſelf, not only confirmes the like Doctrine, by his Reaſons and Authority, but delivers a very ſtrang Example of it; for, under the Title of *Glychyſida*, Treating of *Peony*, He thus Diſcourſes, *Eſt præterea omnino reſiccatoria: Ea propter haud deſperaverim eam ex collo pueris ſuſpenſam merito Comitialem morbum ſanare. Equidem vidi puellum quandoque octo totis menſibus morbo Comitiali liberum, ac poſtea fortuna cum quod à collo ſuſpenſum erat decidiſſet, protinus denuo convulſione correptum; rurſuſque ſuſpenſo in locum illius alio, inculpate poſtea egiſſe, Porro viſum eſt mihi ſatius eſſe rurſum id collo detrahere, certioris experientiæ gratia: id cum feciſſem, ac puer iterum eſſet convulſus, magnam recentis radicis partem ex collo ejus ſuſpendimus, ac deinceps prorſum ſanus effectus eſt puer, nec poſtea convulſus eſt. Rationabile itaque erat, aut partes quaſpiam à radice defluentes, ac deinde per inſpirationem attractas, affectos ita locos curare, aut Aerem à radice aſſidue mutari & alterari. Nam hoc pacto*

De ſimp. Medi. facultatibus. Libro. 6.

Succus

Succus Cyrenaicus collumellam plegmone affectam juvat & Melanthion frictum palam Catarrhos & Coryzas deficcat, Si quis id in calidum linteum, rarum, liget assidueq́, calorem ex eo per inspirationem in nares attrahat. Quin etiam si pluribus linis, & maximè marinæ purpuræ, collo viperæ injectis, illis viperam præfoces, eaque postea cujuspiam collo obvincias, mirifice profueris tum Paristhmiis tum omnibus iis quæ in collo expullulant. Nay, that such invisible Bodies, by passing thorough grosser ones, and thereby changing the Motion and *nexus* or Juncture of their parts, may produce lasting alterations in their Textures (though it be a Paradox) seems not to me at all impossible. For we find the most fluid Body of Quicksilver *has been* sometimes, (I say sometimes) and therefore *may*, without sensible increase of *Bulke*, be coagulated by a Metalline Exhalation so, as to be cut like Lead, and to retain that solidity, 'till by some Art or other it be reduc'd to its pristine Fluidnesse. You may be inclin'd to think, that the hard and solid Body of Iron has a permanent alteration made in it's Texture, if you hold a Needle during a competent time neer the Pole of a Vigorous Loadstone without touching it. For the Magnetical *Effluvia* (as may very probably be conceiv'd) will so dispose the parts of the neareſt extream of the Needle, as that they shall admit the steames that come from one of the Poles of the Load-stone, and not those that come from the other: whereas by skilfully holding it to the contrary Pole of the same Stone, the internal Pores, and consequently the Texture of the Needle, will presently be quite otherwise disposed in reference to the Magnetical *Effluvia*; as we more fully declare in another Essay, where we shall, I suppose, also perswade you, that the Effects of the Load-stone are performed by subtil Bodies issuing from, or passing through it. What

we have in a former discourse told you concerning our having at pleasure changed the Poles of a Load-stone, by help of the Magnetica *Effluvia* of the Earth, may let you see that in Stones, also such alterations are possible to be made. And in the next ESSAY save one, we shall give you another Instance, pertinent to our present purpose. For if you heat a slender piece of Steel (as a graver, or the like) red hot, and suffer it to cool leisurely in the Air, it will continue flexible enough, and of so soft a Texture, that you may easily make impressions on it, with any hardned Steel: But if, instead of cooling it thus slowly, you knock it into such a dry Body, as we shall there name to you, it will immediately grow so hard, as to be brittle. Which alteration, whether it be resolved to proceed from the particular *Effluvia* of the Body, into which it is knocked, or barely from the ingresse of the Corpuscles of Cold; (if any such there be) it will be however an Instance not unfit for our purpose. And those *Pyrophilus*, that are conversant in Glass houses, may easily observe, that Glass acquires a more or lesse brittle Texture, according as (to speak in the Glass-mens language) it is baked. For if after Glasses are blown, they be quickly carried into the open Air, they are wont to be much more subject to break, then those, that after they are fashioned are placed in a kind of very long Oven (which is wont to be built over the Furnace, wherein the materials, whereof the Glass is made are kept in Fusion) and are by slow degrees refrigerated, and not 'till after some houres exposed to the open Air: For whether this difference of Brittleness, and consequently of Texture, be ascribed to the interrupted Transcursion of some Etherial matter, through the Pores of the Glasse, or to the insinuations of the Atoms of the Cold, or to this, that the Particles of the Glasse agitated by the heat, were surpriz'd by the Cold, before

before they could make an end of those Motions which were requisite to their disposing themselves into the most durable Texture; it is evident enough, that 'tis by no gross or visible Body, that this permanent difference of Texture is produced. Of the like to which we may elsewhere give you Examples, in some other Concretes. That also in an human Body, great alterations may be made by very subtil *Effluvia*, appeares evidently, not only by the instances we have formerly given of the efficacy of some outwardly applied Remedies, but by divers other things, as that many are purged by the bare Odor of Potions, of which I have been assured upon his own Observation by the experienced Town Physician of *Plimmouth* Dr *D.* And of which *Salmuth* in his Observations, gives us an instance in a young Gentlewoman, whom he saw more happily purged, by the Odor of a Potion, drunk by her Sister, then she was that took the Medicine. And the same Author tells us, of one Dr *Pfeil* an eminent Physitian, who was wont, when he had a mind to be Purged, to goe into some Apothecaries shop, where Electuaries electively purging were preparing, to which having a while smelt, they would by their Odour, after his return home, work with him six or seven times, as if he had swallowed the Medicine it self. And *Henricus ab Heer*, in the twenty ninth of his formly commended Observations, tells us, Of a Woman that not only was wont to be copiously purg'd by drinking Bief-broth, but having by a fall broken her Leg, us'd no other Cathartick, then the bare Odor of that sort of Broth. And very Observable to our purpose, is the operation of the Air, all along the ridg of the high mountaine in *Peru*, called *Pariacaca*, of which the Learned Jesuite *Joseph Acosta* relates, That though he went as well prepared as he could, to withstand the Operations usually produc'd in Travails, by that piercing

Cent. 3. *Obser.* 4.

Cent. 3. *Obser.* 8.

Lib. 3 *cap.* 9.

piercing Air, yet when he approached to the top of the Mountain, he was (notwithstanding all his Provision) surpriz'd with such fits, and pangs, of striving and casting, as he thought he should cast up his Heart too; having after meat, Phlegme, and Choler, both yellow and green, in the end with over striving cast up Blood; and continued thus sick for three or four houres, 'till he had passed into a more temperate Air then that of the top of the Mountain; which runn's about 500 Leagues, and has every where, though not equally this discomposing property, having operated upon some of his companions, as well downwards as upwards. A greater proof of the power of Steams upon the Body may be taken from the propagation of Infectious Diseases, which being conveyed by insensible *Effluvia*, from a sick into a healthy Body, are able to disorder the whole OEconomy of it, and act those sad Tragedies, which Physitians do so often unsuccessfully indeavour to hinder. But you will cease to doubt, that Corpuscles, though so small as to be below the sense, should be able to performe great matters upon humane Bodies; if you consider what alterations may be therein produced by the bare actions of the parts upon one another. This may appear by the effects of several Passions of the mind, which are often excited by the bare, if attentive, thoughts of absent things. In obstinate grief and Melancholy, there is that alteration made in the disposition of the Heart, and perhaps some other parts by wh ch the Blood is to Circulate, that the lively motion of that liquor is thereby disturbed, and obstructions and other not easily remov'd distempers are occasion'd. The bare remembrance of a loathsome Potion, does oftentimes produce in me (and I doubt not, but the like thought may have the like Operation in many others) a Horror, attended with a very sensible Commotion of divers parts of

my

my Body, especially with a kind of convulsive motion, in or about the Stomack. And what power the Passions have to alter and determine the course of the Blood, may appear yet more manifestly in modest and bashful persons, especially Women, when meerly upon the remembrance or thought of an unchast, or undecent thing, mentioned before them, the motion of the Blood will be so determin'd, as to passe suddenly and plentifully enough into the Cheeks (and sometimes other parts) to make them immediatly wear that livery of Vertue (as an Old Philosopher styl'd it) which we call a Blush. And even by joy, if great and sudden, I not long since saw in persons of both Sexes, not only the Cheeks and Forehead, but it left (as to the Lady) even the Neck and Shoulders Died of that Colour. And that Passions, may not only alter the Motion of the Juyces of the Body, but likewise make some separation and evacuation of them, may appear in grief, which is wont especially in Women to make all the Commotions requisite to weeping: whereby oftentimes a considerable quantity of Briny Liquor, is excluded at the Eyes, under the forme of Tears, by which divers (especially Hysterical) Persons are wont to find themselves much refreshed, though with some it fares otherwisein teeming Women. Also that vehement desire we call Longing, may well be supposed to produce great alterations in the Body of the Mother, which leaves such strange and lasting impressions upon that of the Infant; since 'tis the Mother only, and not at all the Infant that conceives those importunate desires.

CHAP.

CHAP. XIV.

THere are many Instances to be met with in Physitians Books, to shew that Imagination is able so to alter the Imagining person's Body, as to work such a disposition in the Spirits, Blood and Humors of it, as to produce the determinate Disease that is excessively feared. And I remember, that soon after the last Fair Lady *R.* Died of the Small Pox, I chanced to meet one of her Sisters with her Mask on amongst some other Persons of High Quality, and wondring to see her sit Maskt in such Company, her Husband (who was present) told me, That his Wife having been happily brought to Bed some while before her Sister fell sick; he had carefully kept the knowledg of her sickness from his Wife; least the kindness that was betwixt them two might prejudice her in the condition she was in, but that after, a while a Lady unawares making mention in her hearing of her Sisters sickness, she immediatly fancied, That she should have it too, and accordingly fell sick of that disfiguring Disease, whose Marks obliged her for a while to weare a Mask. Nor is it in Women only, but even in Men, that conceit may produce such real and lasting effects. For many authentick Histories record examples of those in whom excessive Grief or Fear has made such a change in the Colour of their Hair in a Night, as Nature would otherwise have scarce made in divers Years. And I remember, that being about four or six Years since, in the County of *Cork*, there was an *Irish* Captain a man of middle Age and Stature, who coming with some of his followers to render himself to your Uncle *Broghill*, who then commanded the English Forces in those parts upon a publick profer of pardon

don to the *Iriſh* that would then lay down Arms, he was caſually in a ſuſpicious Place, met with by a party of the *Engliſh* and intercepted. And my Brother being then abſent, upon a deſigne, he was ſo apprehenſive of being put to Death, by the inferiour officers, before your Uncles returne, that that Anxiety of mind quickly changed the Colour of his Hair after a peculiar manner: of which I being then at that Caſtle of your Unkles whereunto he was brought) had quickly notice given me, and had the Curioſity to examine this Captain, and found that the Hair of his Head, had not (as in the inſtances I had met with in Hiſtories) uniformely changed its Colour, but that here and there certain peculiar Tufts and locks of it, whoſe *Baſes* might be about an inch in *Diameter* were thus ſuddenly turned White all over: the reſt of his Hair (of which you know the *Iriſh* uſe to weare good ſtore) retaining it's former Reddiſh Colour.

[You will miſtake my deſign *Pyrophilus*, if you conclude from what I have ſaid, concerning the Power of *Effluvia*, to work upon the Body that I am either ſo much an *Helmontian* as to condemne the Uſe of all thoſe Remedies that make ſuch more groſſe Evacuations (if I may ſo call them) as are made by Vomit, Seige, and the like; or that I would have you, or am my ſelf ſo credulous, as to believe all the Vertues that are, ev'n by Eminent Writers aſcribed to the Remedies called Specificks: For (to mention here but this) we have obſerved, that the hopes built upon ev'n excellent Specificks, unleſſe they be of ſuch a reſolving and abſterſive Nature, as to be able to make way for themſelves into the Receſſes of the Body are oftentimes diſappointed, where ſome Emetick or Cathartick Remedy has not been firſt us'd to free the Stomack and Guts from thoſe viſcous Humours, which obſtructing the firſt paſſages much enervate the Vertue of the Remedy,

Remedy, if they do not altogether deny it acceſſe to the innermoſt parts of the Body. That then which I aim at, is firſt to keep you from being prejudiced by the Confidence of ſome Learned Doctors, who laugh at the very name of Specificks, and will not allow any Diſeaſe to be curable, but by viſible Evacuations of ſtore of what they call peccant Matter; And next to give you cauſe to think that ſuch Specificks, as men of judgment and credit do recommend upon their own Experience ought not to be rejected without Trial, upon the bare account of their not being either Laxative or Vomitive, Sudorifick, or Diuretical; Nay, nor ſo much as for this, that they are not endow'd with any Eminent Degree of any manifeſt Quality, ſuch as Heat, Cold, Drineſſe, Odor, Taſt, Aſtriction and the like; nor able perchance to work any conſiderable alteration in a healthy Human Body. For I conſider the Body of a living man, not as a rude heap of Limbs and Liquors, but as an Engine conſiſting of ſeveral parts ſo ſet together, that there is a ſtrange and conſpiring communication betwixt them, by vertue whereof, a very weak and inconſiderable Impreſſion of adventitious matter upon ſome one part may be able to work on ſome other diſtant part, or perhaps on the whole Engine, a change far exceeding what the ſame adventitious Body could do upon a Body not ſo contriv'd. The faint motion of a mans little Finger upon a ſmall piece of Iron that were no part of a Engine, would produce no conſiderable Effect; but when a Musket is ready to be Shot off, then ſuch a Motion being applied to the Trigger by vertue of the contrivance of the Engine, the Spring is immediatly let looſe the Cock falls down, and knocks the flint againſt the Steel, opens the Pan, ſtrikes Fire upon the Powder in it, which by the Touch-hole Fires the Powder in the Barrel and that with

with great noiſe throw's out the ponderous Leaden Bullet with violence enough to kill a Man at Seven or Eight hundred Foot diſtance. And that alſo the Engine of a Humane Body is ſo fram'd, as to be capable of receiving great alterations from ſeemingly ſlight Impreſſions of outward Objects, upon the bare account of its particular contrivance, may appear by ſeveral inſtances beſide thoſe which may belong to this Argument in the foregoing part of this Essay. When a man goes ſuddenly out into the Sun, it often happens, that thoſe beames which light upon his Head, and would not in ſo ſhort a time have any diſcernable effect on the leaſt Hair of it, do allmoſt in a moment produce that ſtrange and violent motion in the head and almoſt all the Body, which we call Sneezing. Men that from the top of ſome Pinacle or other high and ſteep place do look down to the bottome of it are at firſt very apt by the bare proſpect, (which yet convey's nothing into the Body but thoſe images, if yet there intervene corporeal ones in ſenſation of viſible Objects that enter at the Eye) to become ſo giddy, that they are reduced to turne away their Eyes from the Præcipice for fear of not being able to ſtand upon their Leggs. And many that look'd fixedly upon a Whirle poole, or upon a very ſwift ſtream have had ſuch a Vertiginous Motion thereby impreſſed on their Spirits, that they have been unable to keep their Bodies upright, but have fallen into the Water they gazed on. And it is no leſſe remarkable, that when a man is ſomewhat diſcompos'd at Sea, and yet not enough to Vomit freely; the Seamen are wont to adviſe him to look from the ſide of the Ship upon the Water, which ſeeming ſwiftly to paſſe by the Veſſel, has upon the gazer the operation of a rapid ſtream, and by making him giddy haſtens and facilitates his Vomiting, as I have ſometimes tried

upon my self when I had a mind for healths sake to be put into a fit of Sea-sickness. If a person be very Tickliſh and you but gently ſtroke the Sole of his Foot with the top of a Feather, that languid Impreſſion on the bottome of the foot ſhall, whether he will or no, put all thoſe Muſcles and other parts into motion, which are requiſite to make that noiſe, and to exhibite that ſhape of the Face (ſo farre diſtant from the feet) which we call Laughing; and ſo the gentle Motion of a ſtraw tickling the Noſtrils is able to excite Sneezing. Moſt men may obſerve in themſelves, that there are ſome ſuch noiſes as thoſe made by the grating of an ungreaſ'd Cart-wheele upon the *Axle-tree*, or the tearing of courſe Paper which are capable of ſetting the Teeth on edge, which yet cannot be done without exciting a peculiar Motion in ſeveral parts of the Head. I had a ſervant, who ſometimes complained to me of a much more remarkable and unfrequent diſorder, namely, that when he was put to whet a Knife, that ſtridulous Motion of the Air was wont to make his Gummes bleed. *Henricus ab Heer* (in his Twenty ninth Obſervation) Records a Story of a Lady, to whom he was ſent for, who upon the hearing of the ſound of a Bell, or any loud noiſe, though Singing, would fall into fits of Sounding, which was ſcarce diſtinguiſhable from Death; and we may confirm that this diſpoſition depended upon the Texture of her Body in reference to Material ſounds by what he ſubjoyns, that having well purg'd her, and given her for two Months the *Spaa*-waters, and other appropriate Remedies he throughly cur'd her. And it often enough happens, that when a Woman is in a Fit of the *Mother*, another Hyſterical perſon ſtanding by, is by reaſon of a peculiar Diſpoſition of her Body, ſoon infected with the like ſtrange diſcompoſure.

And

And to shew you, that a distemper'd Body is both an Engine, and also an Engine disposed to receive alterations from such Impressions as will make none on a sound body, let me put you in mind that those subtile Steames that wander through the Air before considerable changes of Weather disclose themselves, are wont to be painfully felt by many sickly Persons and more constantly by men that have had great Bruises or Wounds in the parts that have been so hurt; though neither are healthy men at all incommodated thereby, nor do those themselves that have been hurt, feel any thing in those sound parts, whose Tone or Texture has not been alter'd or enfeebl'd by outward violence. I have known several also (and the thing is obvious) whose body's and Humours are so fram'd and constituted, that if (as men commonly speak) they ride backward in a Coach, that Motion will make them giddy, and force them to Vomit. And it is very ordinary for Hysterical Women to fall into such Fits as counterfeit Epilepsies, Convulsions, and I know not what violent distempers by the bare smell of Musk and Amber, and other strong perfumes, whose steames are yet so farre from having *great*, much lesse *such* Effects in other Humane body's, that almost all men, and the generality ev'n of healthy Women are not affected by them, unless with some innocent delight. And that even on men Odours (how minute and invisible bodies soever) may sometimes have very great power, may be gathered from the story told us by *Zacutus Lucitanus*, of a Fisherman, who having spent all his life at Sea, and being grown Old there, and coming to gaze upon a solemne reception, made in a Maritine Town, to *Sebastian* King of *Portugal*, was by the perfumes plentifully Burnt, to welcome the King immediatly cast upon the ground thereby into a Fit which two Physicians judg'd Apoplectical, and Physick'd

In Pr. Med. adm. lib. 3. Observat. 99.

him accordingly 'till three daies after the Kings chiefe Phyſician *Thomas à Vega* gueſſing at the cauſe of his diſeaſe commanded him to be remov'd to the Sea ſide and cover'd with Sea Weeds, where within four Houres the Maritime Air and ſteames began to open his Eyes, and made him know thoſe that were about him, and within not many Dayes reſtor'd him to health. We may alſo conjecture how much the alteration produced in the Body by ſickneſs may diſpoſe it to receive ſtrong Impreſſions from things that would not otherwiſe much affect it, by this, That even a man in perfect health, and who is wont to Drink cold without the leaſt harme, may, when he has much heated himſelf by exerciſe be caſt by a draught of cold Drink into ſuch ſudden, formidable, and dangerous diſtempers as, did not daily Experience convince us, we ſhould ſcarce think poſſible to be produc'd in a Body, free from Morbid Humours by ſo familiar a thing as a cup of ſmall bear or water; inſomuch that *Benivenius* relates a Story of one, who after too vehement exerciſe Drinking a Glaſſe of very cold Water fell into a ſwoun, that was quickly ſucceeded by Death. And yet, to adde that on this occaſion, in Bodies otherwiſe diſpos'd a large draught of cold Water, Drunk even without thirſt, may very much relieve the Drincker, and prevent great Fits of the Mother, and partly of the Spleen, eſpecially upon ſuddain frights, to which purpoſes I know ſome Hyſterical Ladies that find in this Remedy, as themſelves aſſure me more advantage then one would eaſily imagine.

And (further) to ſhew you that the Engine we are ſpeaking of is alterable, as well for the better as for the worſe, by ſuch Motions of outward Bodies as in themſelves conſider'd, are languid, or at leaſt may ſeem deſpicable in reference to ſickneſs or recovery; Let me call upon you

you to consider a few, not unobvious things, which may also serve to confirme some part of what has hitherto been deliver'd.

[The true Mosse growing upon a Humane Skull, though I do not find Experience warrant all the strange things some Chymical Writers attribute to it for the stanching of Blood, yet I deny not, but in some Bodies it does it wonderfull enough. And I very well know an Eminent *Virtuoso* who has assur'd me, as his Physitian likewise has done, that he finds the Effects of this Mos so considerable upon himself, that after having been let Blood, his Arm falling to Bleed again, and he apprehending the consequences of it, his Physitian, who chanc'd to be present, put a little of the abovemention'd Mosse into his hand, which barely held there, did, to the Patients wonder, stanch his Blood, and gave him the curiosity to lay it out of his hand, to try whether that Mosse were the cause of the Bloods so oddly stopping its course, whereupon his Arm after a little while, beginning to Bleed afresh, he took the Mosse again into his hand, and thereby presently stanch'd his Bleeding the second time: and if I misremember not, he added, that he repeated the Experiment once more with the like successe. The smoak of burnt feathers, or Tobacco blown upon the face of an Hysterical Woman, does oftentimes almost as suddenly recover them out of Fits of the Mother, as the odour of perfumes did cast them thereinto.]

And now I speak of Cures performable by fumes, it brings into my mind, that a friend of yours and mine, and a Person of great Veracity professes to have strangly cur'd Dysenteries by a way unusual enough, which is to make the Patient sit over a Chair or Stool close on the sides, and perforated below, so that the *Anus* and the neighbouring parts may be expos'd to the fumes of Ginger, which must be thrown

thrown upon a Pan of Embers, plac'd juſt under the Patient, who is to continue in that poſture, and to receive the Fume as long as he can endure it without too much fainting. And when I mention'd one of the Cures that was thus perform'd, to one that is look'd upon as a Maſter of Chymical *Arcana* againſt Diſeaſes; he preferr'd before it (as he ſaies upon experience) the ſhavings of Harts horn us'd after the ſame manner, and the Remedy ſeems not irrational. But if in this diſtemper, the Actual heat applied to the abovemention'd parts of the Body concurre not to the Effect, we may too, warrantably enough, adde that Cures may be perform'd by far more minute corpuſcles then thoſe of ſmoke, inſinuating themſelves from without into the Body. For I know a very dextrous Goldſmith, who, when he over heats himſelf, as he often unawares does at hammering of Plate, is ſubject to fall into Gripings of the Belly, which lead to Fluxes; but his uſual and ready Cure is, aſſoon as conveniently he can, to heat his Anvil, and ſit upon it for a great while together, heating it hot again if there be need. But to return to our Medicinal Smoaks, 'tis known that ſome find more good againſt the Fits of the Colick, by Glyſters of the Smoak of *Tobacco*, then by any other Phyſick they take; ſo that I know wealthy perſons, that relying upon the benefit they find by this Remedy, have left off ſending for their Phyſitians to eaſe them of the Colick. And indeed, when I conſider what an odde Concrete, even common Soot is, and that many Concretes by being reſolv'd into Smoak, may be either more or otherwiſe unlock'd, then they would be by the Stomack of a Man (ſo that I may elſewhere entertain you of the great heightning of ſome Emetick and Cathartick Simples in their operation, by their being reduc'd into Smoak,) and that alſo probably the Operation of ſome Fumes and Odours

may

may be much chang'd and improv'd by their not getting into the Body by the Mouth, but other parts; I am inclinable to think that there might be made further use of them, if Physitians pleas'd, then hitherto has been. For I have made such trial of the Vertue of Sulphureous Smoak, to preserve some Liquors, as I was much pleas'd with. And not only *Paracelsus*, but *Helmont* highly extol, as a grand Specifick in fits of the Mother, the Smoak of the Warts that grow upon the Legs of Horses, conveigh'd to the parts suppos'd to be primarily affected. And I remember, that lately I met with a Gentleman curious and intelligent, who, as himself assur'd me, was by the Scurvy and ill condition'd Ulcers, and other obstinate distempers brought so low, that he was scarce able to turn himself freely in his Bed, and thereupon resolv'd against taking any more Physick, partly out of despair of recovery, and partly out of wearinesse of the tedious courses of Physick the Doctors had in vain made him passe thorow: But that some of his Friends bringing him a certain Surgeon, whom they affirm'd to have strangly cur'd many desperate distempers, by wayes very unusual and not troublesome to the Patient, this Gentleman was content to put himself into his Hands, the Surgeon promising that he would not give him any other Physick, but now and then a Cup of Sack by way of Cordial; his way of Cure being to fumigate the Patient very well every Morning with a certain Smoak, which that Gentleman thinks, by what he took notice of, in the Powder that yeelded it, to have been some Vegetable substance. And with this Remedy in a short time he grew perfectly well, and came home a while since in very good health from a Voyage, which the confusions of his own Country invited him to make as far as the *East-Indies*. This Surgeon, whose name I cannot hit upon, dying suddenly, his secret (which

(which was try'd upon divers others besides this Gentleman) is for ought we yet know, dead with him.

[But as for the efficacy that may be found in appropriated Fumes and Steams. We have more then once by barely unstopping and holding under her Nose a smal Phial of highly rectified Spirit of Sal-Armoniack, or even of Harts horn almost presently recover'd a Young Beauty I need not name to You; out of strange Fits that were wont to take her more suddenly then those of the Falling Sickness, and were look'd upon as Epileptical, though perchance they were not meerly so. To which I shall adde, that a Lady that both You *Pyrophilus*, and I know and love very well, though she have been long subject to violent and tedious Fits of the Head-ach, and though that distemper have since been much increas'd by a great concussion of her Head, occasion'd by the overturning of a Coach, yet she is wont presently to be relieved, barely by holding her Head a pretty while over a strong decoction of *Thee*, and breathing in the Steams of it.]

And now I am discoursing of Cures made by Steams, or other seemingly slight means, I must not pretermit a thing so remarkable, that if it were more generally known in *Europe*, I should think it somewhat strange to find it so little reflected on by Physitians; and that is the constant and almost suddain ceasing of the Plague, how raging soever, in the almost incredibly populous City of *Grand Cayro* in *Ægypt* towards the latter end of *June*, about which time in most Countries in our Hemisphere it is wont to spread fastest and be most rife. The truth of this is attested by so many Travellers of several Nations, that 'twere injurious to doubt of it, and not only the Dexterous Mr *R.* whom you well know, and who lived at *Cayro* has confir'md to me the truth of it.

But

But the Learned *Prosper Alpinus*, who both was an excellent Physitian, and spent many Years in *Ægypt*, gives us this particular account of it, *Pestis Cayri atq; in omnibus locis Ægypti invadere eos populos solet ineunte Septembri mense, usq; ad Junium: his enim omnibus mensibus, à Septembri ad Junium usq;, Pestis aliunde per contagium illuc asportata eam gentem invadere solet*: And after a few Lines, *Junio vero mense, qualiscunq; & quantacunq; sit ibi Pestilentia, Sole primam Cancri partem ingrediente omnino tollitur, quod multis plane divinum esse non immerito videtur*: *Sed quod etiam valde mirabile creditur, omnia suppellectilia, Pestifero contagio infecta, tunc nullum Contagii effectum in eam gentem edunt; ita ut tunc ea vobis in tutissimo & tranquillissimo statu reducatur, ex summe morboso*: *atq; morbi particulares, sporadici, à Græcis vocati tunc apparere incipiunt, qui nusquam gentium tempore Pestis apparebant*. And in the next Chapter, inquiring at large into the causes of this Wonder, he denys it to proceed from the increase of the *Nile*, which happens to be coincident in point of time with the extinction of the Plague, because that the Infection ceaseth before the swelling of the River is considerable; and ascribeth it rather to the alteration of the Air, produc'd by the Northernly Winds which then begin to blow, and some other Circumstances: speaking of which, *Hæc* (saith he) *per id temporis incipiunt observari à quibus fortasse non immerito causam extinctionis Pestis morbosiq; in salubrem statum mutationis pendere arbitror: quando nulla alia ex conservatricibus causis, quas vulgus medicorum res non naturales appellat, aëre excepto, ibi eo tempore appareat, in quam morbosi status in salubrem mutationem referre possumus: ideo necessarium erit hujusce mutationis causam Aëris mutationi acceptam referre, &c.* Upon this Instance, *Pyrophilus*, I have presum'd the longer to insist, because

De Medicina Ægyptiorum, lib. 1. cap. 17.

Ibidem, cap. 18.

(if you duly reflect on it) you will, I suppose, discern, that it much credits and elucidates a great part of what hath been delivered in divers of the foregoing Leaves, concerning the possibility of Natures doing great matters against Diseases, without the help of gross and sensible Evacuations.

CHAP. XV.

AND since we have represented a humane Body as an Engine, we shall adde, That it may be altered both for the better and for the worse, by such bare motions or impulses of external Bodies, as act but in a gross and confessedly Mechanical manner: For 'tis known, that out of such speedily killing, unless seasonably remedy'd Distempers, as Fits of Swounding, Patients of either Sex are often recovered without any inward Medicine, by being barely pinch'd in several places. I, that have endured great and dangerous Sicknesses, have scarce ever found any so violent for the time, as that wch the bare motion and smell of a Ship and Sea Air hath put me into, especially in rough weather, till I was somewhat accustomed to Navigation; and yet this violent and weakning Sickness, as it was not produced by any peccant Humor in the Body, so it was quickly removed by the Air, and Quiet of the Shore, without the help of Physick. And the like may be observed more suddenly in the newly mentioned Instances of those in whom, as the bare agitation of a Coach will produce such violent Fits of Vomiting and such Faintness, that I have known some of them apprehend they should presently die; so the bare cessation of that discomposing motion soon relieved them. We see in our Stables, what operation, the currying of them carefully, hath upon

our

our Horſes. And *Helmont* ſomewhere tells us, That himſelf, as I remember, could by the Milk of an Aſs, tell whether ſhe had been that day diligently curryed or no; and ſo conſiderable an alteration in Milk ſhould, me-thinks, ſtrongly argue, that a great one in the Blood or other Juice, of which the Blood is elaborated, and conſequently in divers of the principal parts of the Body muſt have preceded it. But to prefer our conſideration from the Bodies of Beaſts to thoſe of Men, 'tis remarkable what *Piſo* confeſſeth, the illiterate *Braſilian* Empericks are able to perform with Fricti-ons, even as unskilfully as they order them: *Mira equidem,* ſaith he, *tum tuendæ ſanitatis ergo, cum in pleriſq; morbis ſanandis, fr ctione & unctione frequenti incolæ præſtant, illam in frigidioribus, & chronicis, hanc in acutioribus adhibentes. Quæ remedia lubenter advenæ imitantur, & ut par eſt, ex legibus artis hæc & plura medendi Empiricorum genera moderantur.* And as *Galen* himſelf highly extols a skilful Application of Cupping-glaſſes in the Colick; ſo in *Braſil* they finde that the like Remedy is ſtrangely ſucceſsful: For *Cholera ſicca,* ſaith our candid *Piſo* in another place, *eiſdem fere Remediis* (of which he had been ſpeaking) *curatur, maxime ſi regioni hepatis corneæ cucurbitulæ applicentur. De quibus merito hoc teſtor, quod Galenus de ſuis cucurbitulis, quas in Colico affectu incantamenti inſtar operari tradidit.*

Hiſtor. Nat. Med. lib. 2. cap. 5. pag. 33.

Idem cap. 11.

We ſhall adde, for further confirmation, that notwithſtanding all the horrid Symptomes that are wont to enſue upon the biting of that Poyſonous Spider, the *Tarantula,* that laſting and formidable Diſeaſe, which often mocks all other Remedies, is by nothing ſo ſucceſsfully oppoſ'd, as by Muſick. Some determinate tune or other which proves ſuitable to the particular Nature of the Patients Body, or that

of the Poyſon producing there ſuch a motion, or determination of ſome former motion of the Spirits, or the Humors, or both; as by conducting the Spirits into the Nerves and Muſcles inſervient to the motion of the Limbs, doth make the Patient leap and dance till he have put himſelf into a Sweat, that breaths out much of the virulent Matter which hath been probably fitted for expulſion, by ſome change wrought in its Texture or Motion, or thoſe of the Blood, by the Muſick. For if Sweat and Exerciſe, as ſuch, were all that relieved him, why might not *Sudorificks*, or leaping without Muſick, excuſe the Need of *Fidlers?* which yet is ſo great, that *Kircher* informs us, That the *Apulian* Magiſtrates are wont to give Stipends, at the publick charge, to ſuch to relieve the Poor by their playing. And not onely He hath a memorable Story of *Robertus Pantarus*, a *Tarantine* Nobleman, whoſe Diſeaſe being not known to proceed from the biting of a Spider, could by no Remedies be cured; he was at length, even upon the point of death, ſuddenly reliev'd, and by degrees reſtored to perfect health by the uſe of Muſick: But *Epiphanius Ferdinandus*, in his accurate Obſervations concerning thoſe bitten with the *Tarantula*, together with *Mathiolus*, and other Authors bear witneſs thereunto, by reſembling Narratives. Now that a Sound (not barely as a ſound, but as ſo modified) may powerfully operate upon the Blood and Spirits, I, who am very Muſically given, have divers times obſerv'd in my ſelf, upon the hearing of certain Notes. And it might be made probable, both by that which we have formerly ſaid of the effect of ſkreaking upon the Teeth and Gums, and by the Dancing Fit, into which not every Muſical Sound, though never ſo loud, but ſome determinate Tune is wont to put the bitten Patient.

Muſurg. lib. 9. cap. 4.

Patient. But it may be more manifestly prov'd, by the following testimony of our inquisitive Jesuite, wherein he affirms, That the Spiders themselves may, as well as those they have bitten, be made to Dance by Tunes, suited to their peculiar Constitutions. †

† *Ubi sonatores qui Musicâ suâ hoc malũ etiam publicis magistratus stipendiis ad pauperum remedium solatiumque conducti curare consueverunt, ad curas patientium certius faciliúsque accelerandas, primo ex infectis quærere solent ubi, quo loco, aut campo, aut cujus coloris Tarantula erat, à quo morsus ipsis sit inflictus. Quo facto indicatum locum protinus, ubi frequentes numero atque omnis generis Tarantulæ retium texendorum laboribus incumbunt, accedere solent Medici Citharædi, variáque tentare harmoniarum genera: ad quæ mirum dictu, nunc has nunc illas saltare non secus ac duorum polychordorum æqualiter concinnatorum, personatione illæ chordæ, quæ similes sibi fuerint tono, & æqualiter tensæ moventur, reliquis immotis, ita ut pro similitudine & conditione Tarantularum nunc has nunc illas saltare comperiunt. Cum vero ejus coloris Tarantulam quæ à patiente indicata fuerat in saltum prorumpere viderint, pro certissimo signo habent, modulum se habere verum & certum humori venenoso τῦ ταραντίζοντ& proportionatum, & ad curandũ aptissimũ, quo si utantur infallibilem curæ effectũ se consequi asseverunt.*] Kircher: Musurg: *lib.* 9. *part.* 2. *cap.* 4.

And this I the less wonder at, because *Epiphanius Ferdinandus* himself, not onely tells us of a Man of 94 Years of age, and so weak that he could not go, unless supported by his Staff, who did, upon the hearing of Musick after he was bitten, immediately fall a dancing and capering like a Kid; and affirms, That the *Tarantula*'s themselves may be brought to leap and dance at the sound of Lutes, small Drums, Bagpipes, Fiddles, *&c.* but challenges those that believe him not to come and try, promising them an Ocular Conviction: and adds what is very memorable and pleasant, That not onely Men, in whom much may be ascribed to fancy, but other Animals being bitten may likewise, by Musick, be reduc'd to leap or dance: for he saith, He saw a Wasp, which being bitten by a *Tarantula* whil'st a Lutanist chanc'd to be by; the Musician playing on his Instrument, gave them the sport of seeing both the Wasp and Spider begin to dance: annexing, That a bitten Cock did do the like.

Histor: 81.

Vide Sennerti Practic. lib. 1. *p.* 2. *cap.* 16.

CHAP.

CHAP. XVI.

I Might also, *Pyrophilus*, confirm what I told you, when I said, That Sickness may produce such an alteration in the Fabrick of the Body, as to make it capable to be very much affected, as well for the better as for the worse, by such things that would not scarce at all affect it if it were sound, from the consideration of those many and strange ἰδιοσυγκρασίαι, or *Peculiarities*, to be met with in some Persons in Sickness and in Health. For though many of these differences between healthy Men, are not likely to be greater then may be observ'd between the same Man when well, and himself as the Oeconomy of his Body may be dis-compos'd by some Distemper; yet we often see, that some Persons have the Engine of their Body so fram'd, that it is wonderfully disordered by such things as either work not at all on others, or work otherwise on them: as it is common enough for Men to be hugely disturb'd, and some of them to fall into Fits of trembling or swooning, upon the sight or hearing of a Cat. And to such an affection I know a very eminent Commander obnoxious, Your late Unkle, the last Earl of *Barrymore*, a very gallant Noble Man, and who did his Country great Service in the Irish Wars, had the like apprehension for *Tansey*. I cannot see a Spider near me, without feeling a notable commotion in my Blood, though I never received harm from that sort of Creature, and have no such abhorring against Vipers, Toads, or other venomous Animals. You know an excellent Lady (marryed to a Great Person that hath more then once govern'd *Ireland*) whose Antipathy to Hony, which is much talked of in that Country, hath display'd it self upon several occasions: notwithstanding

ing which, her experienc'd Phyſitian imagining that there might be ſomething of conceipt in her Averſion, took an opportunity to ſatisfie himſelf, by mixing a little Hony, with other Ingredients, of a Remedy which he applyed to a very ſlight and inconſiderable cut or ſcratch, which ſhe chanced to get on her Foot; but he ſoon repented of his Curioſity, upon the ſtrange and unexpected diſorder which his (in other caſes innocent) Medicine produc'd, and which ceaſing upon the removal of that, and application of other ordinary Remedies, ſatisfied him, That thoſe Symptomes were to be imputed to the Hony, and not the bare hurt. The ſame excellent Lady, I remember, complained to me, That when ſhe was troubled with Coughs, all the Vulgar, Pectoral and Pulmoniack Remedies did her no good, ſo that ſhe could find relief in nothing but either the Fume of powdred Amber, taken with convenient Hearbs in a Pipe, or that *Balſamum Sulphuris* which we have already taught you in this Eſſay.

[I know a Perſon of Qüality, tall and ſtrongly made, who lately asked my Opinion, Whether, when he had need of Vomit, he ſhould continue to make uſe of Cauphy, in regard it wrought ſo violently with him: This gave me the occaſion, as well as curioſity, of enquiring particularly both of Himſelf and his Lady, concerning this odde Operation of Cauphy upon him; and I was told, That an ordinary Wine-glaſs full of the uſual warm decoction of Cauphy, boyl'd in common Water, was wont, within about two hours, to prove emetick with him, and before Noon did give him eight, ten, or ſometimes twelve Vomits, with ſo much violence, that he was leſs affected by the infuſion of *Crocus metallorum*, or other uſual emeticks, and therefore was deliberating whether he ſhould not change Cauphy for

ſome

ſome of them, though finding its Operation very certain, he had for ſome Years accuſtomed himſelf to take that Vomit: And that which is alſo remarkable in this matter, is, that he tells me, That ſcarce any Vomit is more troubleſome to him to take, then that above-mentioned is grown of late, ſo that even the odour of Cauphy, as he paſſeth by Cauphy-houſes in the Street, doth make him ſick; and yet that Simple is to moſt Men ſo far from being Vomitive, that it is by eminent Phyſitians, and in ſome caſes not without cauſe, much extoll'd as a ſtrengthner of the Stomack. And this very Gentleman, himſelf, uſed it a pretty while againſt the Fumes that offended his Head, without finding any Vomitive Quality at all in it.]

The Books of ſober and learned Phyſitians, afford us Examples of divers ſuch, and of much more ſtrange Peculiarities, and likewiſe of ſuch Perſons who having deſires of certain things very extravagant, and even abſur'd (ordinarily not onely improper, but hurtful to their Diſtempers) have been cured by the uſe of them, of very dangerous and ſometimes hopeleſs Diſeaſes: Of which kinde of Cures I may alſo elſewhere tell you what I have obſerved, and ſome credit may be brought to ſuch Relations, by what we ordinarily ſee more greedily devoured (without much harm) by longing Women, and Maids troubled with the Green-ſickneſs.

But now, *Pyrophilus*, ſince the Engine of an humane Body thus appears to be ſo fram'd, that it is capable of receiving great alterations from ſuch unlikely things as thoſe we have been mentioning, Why ſhould we haſtily conclude againſt the efficacy of Specificks, taken into the Body, upon the bare account of their not operating by any obvious quality, if they be recommended unto us, upon their own experience,

perience by ſober and faithful Perſons? And that ſcarce ſenſible quantities of Matter, having once obtained acceſs to the maſs of Blood (which is very eaſily done by the Circulation) may, by the contrary and ſwift motion, and by the Figure of the Corpuſcles it conſiſts of, give ſuch a new and unnatural impediment or determination to the motion of the Blood, or ſo diſ-compoſe either its Texture, or that of the Heart, Brain, Liver, Spleen, or ſome ſuch principal part of the Body (as a ſpark of Fire reduceth a whole Barrel of Gunpowder, to obey the Laws of its motion, and become Fire too; or as a little Leaven is able, by degrees, to turn the greateſt lump of Dow into Leaven) need be manifeſted by nothing, but the Operations of ſuch Poyſons as work not by any of thoſe (which Phyſitians are pleaſed to call) *Manifeſt Qualities*. For though I much fear, that moſt of thoſe that have written concerning Poyſons, ſuppoſing that Men would rather believe then try what they relate, have allowed themſelves to deliver many things more ſtrange then true; yet the known effects of a very ſmall quantity of *Opium*, or of *Arſenick*, of the ſcarce diſcernable hurt made by a Vipers Tooth, and eſpecially of the biting of a mad Dog (which ſometimes, by leſs of his Spittle then would weigh half a Grain, ſubdues a whole great Ox into the like madneſs, and produceth truly-wonderful Symptomes both in Mens Bodies and Beaſts) are ſufficient to evince what we propoſed.

And that Man's Body may be as well ſometimes cured, as we ſee it too often diſcompoſ'd, by ſuch little proportions of Matter, may (not now to mention the queſtionable Vertues aſcrib'd to many Antidotes) be gathered from that Experiment, ſo common in *Italy* and elſewhere, of curing the invenom'd biting of Scorpions, by anointing the bitten and

tumid place with common Oyl, wherein ſtore of Scorpions have been drown'd and ſteep'd. And a reſembling Example of the Antidotal Vertue, wherewith Nature hath enrich'd ſome Bodies, is given us by the above-commended *Piſo*, in his *Medicina Braſilienſis*, where (treating of the Antidotal Efficacy of the famous *Braſilian* Herb *Nhanby*, eaten upon an empty Stomack) he adds this memorable Story; That he himſelf ſaw a *Braſilian*, who having caught an over-grown Toad, and ſwell'd with Poyſon (ſuch a one as *Braſilians* call *Cururu*) which uſeth to be as big again as the *European* Toad, and deſperately venomous (which perhaps our Toads are not) he preſently killed him, by dropping on his back the Juice of the Flowers and Leaves of that admirable Plant. And you may remember, that the ſame Author formerly told us, in effect, that as great and ſalutary changes may be produced even in humane Bodies, where he relates, That he had known thoſe that had eaten ſeveral ſorts of Poyſon, Snatch'd, in a trice, from imminent death, by onely drinking ſome of the Infuſion of the Root he calls *Jaborandi*; and this, after I know not how many *Alexipharmaca* and *Theriacal* Antidotes had been fruitleſly adminiſtred.

Lib. 4. *Cap.* 48.

See the ſame Author, *Lib.* 3. under the Title *Cururu*.

You will perchance tell me, *Pyrophilus*, that theſe three or four laſt Inſtances are of Poyſonous Diſtempers and their Antidotes; not of ordinary Diſeaſes, and their Specifick Remedies. But to this I have a double Anſwer: and Firſt, Many of thoſe Diſtempers that proceed from Poyſon, are really Diſeaſes, and both call'd by that Name, and treated of, as ſuch, by Phyſitians. And indeed they may well look upon them but as Diſeaſes, exaſperated by a virulent Malignity, which yet appears to be not always eaſily diſtinguiſhable from that of Diſeaſes that proceed not from Poyſon, by this, That otherwiſe the Phyſitians of Princes and great Men, if after having con-

considered all the inward Parts of their dis-bowell'd Patients, could not so often doubt and dispute, as they do, whether or no Poyson were accessary to their death. And *Piso* (who learn'd divers of their detestable Secrets from the *Brasilians*) relates, That some of them are so skilful in the cursed Art of tempering and allaying their Poysons, that they will often hinder them from disclosing their deleterial Nature for so long a time, that the subtle Murtherers do as unsuspectedly as fatally, execute their Malice or Revenge. These Diseases indeed are wont to differ in this from Surfeits, and other resembling ordinary Diseases; that in the one, the venomous matter that produceth the Disease, is at first much more small, then in the other the morbifick Matter is wont to be. But the activity of this little quantity of hostile Matter doth make it so pernicious, that the Disorders it produceth in the Body, being much greater then that of ordinary Sicknesses is; the cure of such Distempers is the fitter to manifest how powerfully Nature may be succour'd, by Remedies that work not by first or second Qualities, since such are able to deliver Her from Diseases heightned by a peculiar and venomous malignity.

To this first I shall subjoyn my next, which is, That divers Passages of the former Discourse (especially what we have related concerning the cure of Agues, of the Rickets, and of the Kings-Evil) may satisfie you, That even of ordinary Diseases (some at least) may be as well cured by Specificks, as those produced by Poyson are by Antidotes.

You may also say, *Pyrophilus*, *But what if a recommended Specifick do not onely seem unable to produce the promised Effect, but have Qualities, which according to our Notions of the nature of the Disease, seem likely to conspire with it and increase it?*

I Answer,

First, That though it is better for a Patient to be cured by a rashly and unskilfully given Medicine, then to die under the use of the most skilfully administred Physick; yet that the Physitian who looseth his Patient, after having done all that his Art prescribed to save him, deserves more commendation then he that luckily chanceth to cure his Patient by an irrational course. And therefore in such a case as you put, *Pyrophilus*, I think the Physitian ought to be very well satisfied of the matter of Fact, before he venture to try such a Remedy, especially if more ordinary and unsuspected means have not been imployed and found ineffectual; for it is not one lucky Cure that ought to recommend to a wary Physitian the use of a Remedy, whose dangerous Quality seems obvious, whereas its vertue must be credited upon Report.

But then secondly, If the Physitian be duly satisfied of the efficacy of the Remedy, upon a competent number and variety of Patients, I suppose he may, without rashness, make use of such Remedies at least, where ordinary Medicines have been already fruitlesly try'd.

CHAP. XVIII.

THat you may cease to wonder at my daring to say this, *Pyrophilus*, I must offer to you three or four Particulars.

And first, it is manifest to those that are inquisitive, That the true Nature and Causes of several Diseases, are much less certain, and much more disputed of among the Doctors themselves, then those that are not inquisitive imagine: Nor is the method of curing divers particular Diseases

eaſes more ſetled & agreed on, that depending chiefly upon the knowledg of thoſe Cauſes, which as I was ſaying, are controverted.' Tis not that I am either an Enemy to Method in Phyſick, or an Undervaluer of it; but I fear the generality of Phyſitians, (for I intend not, nor need not all along this Eſſay ſpeak of them all) have as yet but an imperfect Method, and have, by the narrow Principles they were taught in the Schools, been perſwaded to frame their Method rather to the barren Principles of the *Peripatetick* School, then to the full amplitude of Nature. Nor do I finde that Phyſitians have yet done ſo fit a thing, as ſeriouſly (and with the attention which the importance of the thing deſerves) on the one ſide, to enumerate and diſtinguiſh the ſeveral Cauſes, that may any whit probably be aſſign'd, how the *Phænomena* of that diſordered ſtate of the humane Body, which we call a Diſeaſe, or its Symptomes, may be produced. And on the other ſide, by how many and how differing ways the *Phænomena* may be removed, or the Diſeaſes they belong to deſtroy'd: And if this were analytically and carefully done, I little doubt but that Mens knowledge of the Nature and Cauſes of Diſeaſes, and the ways of curing them, would be leſs circumſcrib'd and more effectual then now it is wont to be. And I am apt to think, that even Methodiſts would then finde that there divers probable, if not promiſing Methods (proper to divers caſes) which Ways they yet over-look: And though in a right ſenſe it be true, that the Phyſitian is but Natures Miniſter, and is to comply with Her, who aims always at the beſt; yet if we take them in the ſenſe thoſe Expreſſions are vulgarly uſed in, I may elſewhere acquaint You with my Exceptions at them, and in the mean time confeſs to you, That I know not whether they have not done harm, and hindred the advancement of Phyſick, faſcinating the mindes of Men,

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and keeping them from those effectûal Courses, whereby they may potently *alter* the Engine of the Body; and by rectifying the Motion and Texture of its Parts, both consistent and fluid, may bring Nature to their bent, and accustom Her to such convenient Courses of the Blood and other Juices, and such fit times and ways of evacuating (what is noxious or superfluous *&c.*) as may prevent or cure divers stubborn Diseases, more happily then the vulgar Methodists are wont to do.

And indeed, it is scarce to be expected, that till men have a better Knowledg of the Principles of Natural Philosophy, without which 'tis hard to arrive at a more comprehensive Theory of the various possible causes of Diseases, and of the contrivance and uses of the parts of the Body, the Method which supposes this Knowledg should be other then in many things defective, and in some erroneous, as I am apt to think, the vulgar Method may be shewn to be as to some particular Diseases. Of this I may perhaps elsewhere acquaint you more particularly with my suspicions, and therefore I shall now only mention the last Observation of this kind I met with, which was in a Gentleman, You and I very well know, who being for some Months much troubled with a difficulty of breathing, and having been unsuccesfully treated for it by very Eminent Physitians, we at last suspected, that 'twas not the Lungs, but the Nerves that serv'd to move the Diaphragme and other Organs of respiration, upon whose distemper this suppos'd *Asthma* depended, and accordingly by a taking or two of a Volatile Salt of ours, which is very friendly to the *genus Nervosum*, he was quickly freed from his trouble some distemper, which afterwards he was fully perswaded did not proceed from any stuffing up of the Lungs. To be short, how much esteem soever

we

we have for Method, yet since that it self and the Theories whereon men ground it, are, as to divers particular Diseases, so hotly disputed of, even among Eminent Physitians, that in many cases a man may discerne more probability of the successe of the Remedy, then of the truth of the received Notion of the Disease; In such abstruse cases me-thinks it were not amiss to reflect upon that reasoning of the auncient Empericks (though on a somewhat differing occasion) which is thus somewhere expres'd by *Celsus*: *Neque se dicere consilio medicum non egere, & irrationabile Animal hanc artem posse præstare, sed has latentium rerum conjecturas ad rem non pertinere; Quia non interest, quid morbum faciat, sed quid tollat.* And as the controverted Method in the abovemention'd Diseases is not yet establish'd or agreed on in the Schools themselves, so divers of those that are wholly strangers to those Schools, do yet by the help of Experience and good Specificks, and the Method their Mother-wit does, according to emergencies, prompt them to take, perform such considerable cures, that *Piso* sticks not to give this Testimony to the utterly Unlearned *Brasilian* Empericks. *Interim*, saies he, *seniores & exercitatiores eximii sunt Botanici, facilique negotio omnis generis medicamina ex undiquaq; in sylvis conquisitus conficiunt. Quæ tanta sagacitate internè & externè illos adhibere videas, præcipuè in morbis à veneno natis, ut quis illorum manibus tutius & securius se tradat, quam medicastris nostris sciolis, qui secreta quædam in umbra nata atq; educata crepant perpetuo, & ob has Rationales dici volunt.* *Hist. Nat. & Med. Lib. 2. pag. 23.*

Secondly, There are divers Medicines, which though they want not some one quality or other proper to encrease the Disease against which they are administr'd, are yet confidently us'd by the most judicious Doctors, because that they are also inrich'd with other qualities, whereby they may do

do much more good then their noxious quality can do harm; as in a Malignant Feaver, though the distemper be Hot, and though Treacle and some other Antidotal Sudorificks be hot also, yet they are usefully administred in such Diseases, because the reliefe they bring the patient by oppugning the Malignity of the peccant matter, and perhaps by easing him of some of it by sweat, is more considerable then the harm they can do him, by encreasing for a while his Heat.

Cap. 2. The very experienced *Bontius*, Chief Physitian to the *Dutch* Plantation in the East-*Indies*; in his *Methodus medendi Indica*, Treating of the *Spasmus*, which (though here unfrequent) he reckons among the Endemial Diseases of the *Indies*, commends the Use of *Quercetanus*'s *Laudanum*, of *Philonium*, and principally of an Extract of *Opium* and *Safron*, which he describes and much Extols; and least his Readers should scruple at so strange a prescription, he adds this memorable passage to our present purpose. *Fortassis* (saies he) *Sciolus quispiam negabit his remediis, propter vim stupefactivam ac narcoticum nervisque inimicam, esse utendum. Speciosa quidem hæc prima fronte videntur sed tamen vana sunt. Nam præterquam quod calidissima hujus Climatis temperies non requirat, certissimum est in tali necessitate: sine his ægrum evadere non posse. Adde quod nos tam rite Opium hic præparamus ut vel infanti innoxie detur: & sane ut verbo absolvam) si Opiata hic nobis deessent in morbis calidis hic grassantibus frustra remedia adhiberemus quod etsi imperitis durum, ex progressu tamen me nihil temere dixisse patebit.*

The drincking freely, especially if the Drink be cold Water, is usually (and in most cases, nor without much reason:) strictly forbidden, as very hurtful for the Dropsie, and yet those that frequent the *Spaa*, tell us of great cures perform'd by pouring in plenty of Waters into the Patients already di-

distended Belly; and I know a Person of great Quality, and Vertue, who being by an obstinate Dropsy, besides a complication of other formidable diseases, brought to a desperate condition, was advis'd to Drink *Tunbridg Waters*, when I happn'd to be there, by her very skilful Physitian: Who told me, that the Doctors having done all their Art could direct them unto in vain, she would be cur'd by Death, if she were not by these Waters; from whence (the weather proving very seasonable for that sort of Physick) she return'd in so prosperous a condition of recovery, as exacted both his and my wonder. That the Decoction of so heating a Simple as *Guajacum*, would be lookt upon by the generality of Physitians, both *Galenists* and *Chymists*, as a dangerous Medicine in Pthisical and other consumptions, you will easily grant: and yet some eminent Physitians, and (particularly *Spaniards*) tell us of wonderful cures they have perform'd in desperate Ulcers of the Lungs by the long use of this Decoction, notwithstanding its manifestly and troublesomely heating Quality. And I know a Physitian eminently learn'd, and much more a Methodist, then a Chymist, who assures me, that he has made trial of this unlikely way of curing Consumptions with a successe that has much recommended these Paradoxical *Spaniards* to him. 'Tis also believ'd, and not without cause, by Physitians, that *Mercury* is wont to prove a great enemy to the *Genus nervosum*, and often produces Palseys, and other distempers of the Brain and Nerves: and yet one of the exactest and happiest Methodists I know, has confess'd to me, that *Mercurial* preparations are those which he uses the most successfully in *Paralytical* and the like distempers of what Physitians call the *Genus nervosum*. And on this occasion, I remember, that a Gentlewoman being confin'd to her Bed by a Dead Palsey, that had seis'd on one side of

her Body, a Physitian eminent for his Books and Cures, giving her a dose of a certain Preparation of *Mercury*, corrected with a little Gold, which I put into his hands for that purpose, was pleas'd to bring me word, that by the first taking of the Powder, which wrought but gently by Siege, without either Vomits or Salivation, she was enabled the same or the next day to quit her Bed, and walk about the Room.

Thirdly there are many things which seem to be against reason whilst they are barely propos'd and not prov'd for which we afterwards discerne very good reason: when experience, having satisfied us they are really true, has both invited us, and assisted us to enquire into their causes. Of this we have elsewhere given divers not Medical Instances in our Essay *Concerning improbable Truths*: And I could easily enough, if I durst be tedious, give you some Medical Illustrations of the same truth. But I dare now only invite you to consider this one thing, which may be of great use to explicate many others, both in Natural Philosophy, and in Physick too, which is, That there are divers Concretes, some of them as to Sense, *Similar*, or *Homogeneous*, whose differing parts are endow'd with very differing and sometimes contrary Qualities. And this not only appeares in the Chymical Analysis of Bodies made by the fire, where the difference of what Chymists call the separated Principles of Concretes is often very manifest and great, but ev'n in divers Bodies that have not been resolv'd by the violence of the Fire; as is evident in *Rhubarb* taken in substance, whose subtiler parts are purging, and its terrestrial astringent: Nay, if those parts which do in much the lesse quantity concurre to the constitution of the concrete do but meet with a Body dispos'd to receive their Impressions, it is very possible,

sible, that they may work more powerfully on it then the other Parts of the same Concrete, of which the Eye judgeth it altogether to consist.

This I have made out to some ingenious Men, by shewing, that though Sallet Oyl be generally reputed to consist of Fat and Unctuous Particles, and therefore to be a great resister of Corrosion; yet it containes in it sharp and piercing parts, which meeting with a disposed subject, do more powerfully operate then the more purely Oleaginous ones. As we endeavoured to evince by keeping for a short while in a gentle warmth, some pure Oyl-Olive, upon a quantity of Filings of ev'n crude Copper: For from them the Liquor extracted an high Tincture betwixt Green and Blew, like that which such Filings would have given to Distill'd Vineger, which according to Chymists Notions obtains that Colour, by making with its Acid and Corrosive Salt a real solution of some part of the Copper, as may appear by the recoverableness of the metal out of it. Another proof or two of the Acrimony of some of the parts of Oyl we may elsewhere give you. But now we shall rather confirme our Answer to your Question, by two or three Examples of Cures perform'd by unlikely Remedies.

I went once to visit an Ingenious *Helmontian*, whom I found Sick on his Bed, and having by the Symptomes of his Disease, discern'd it to be a *Pleurisy*, I talk'd with him of seasonably opening a Veine, but he was resolv'd against it, and told me he would cure himself by a remedy, which at first seems as likely to encrease such a disease as Phlebotomy is to cure it, namely by the use of Helmonts *Laudanum Opiatum* which in effect did in three or four daies cure him, and since he without Blood letting cur'd some others with it; which I the lesse wonder at, because of my having observ'd

that *Opium* (with which unskilful men seldome tamper without danger) if duely corrected and prepared proves sometimes a great resolver, and commonly a great Sudorifick insomuch, that I have known it make a person copiously sweat, who often complain'd to me, that other Diaphoreticks had no such operation on him.

I have oftentimes seen Coughs strangly abated by the use of a Remedy, which I have not long since told you, how I prepare: and with which (I remember) in a pretty Child you (*Pyrophilus*) know, and who is now very well, I was so happy as to represse in a few Houres a violent Cough, that threatned her with Speedy Death, and yet this Medicine has so eminent a saltnesse, that the Tongue can scarce suffer it; and how much the use of Salt things is by many Physitians condem'd in Coughs (and indeed in many cases not without Reason) I need not tell You. And with exceedingly piercing Essence or Spirit of Mans Blood, I have known, notwithstanding its being very Saline, and its manifestly heating the Patient, especially for the first Four or Five daies, strange things perform'd even in a deplorable and hereditary Consumption. This *Pyrophilus* brings into my mind, something, that, it may be, you will think odde, which is, that having had occasion to advise for a person of high quality, with a very ancient Galenist, that in his own Country was look'd upon as almost an Oracle, and particularly in reference to Phthisical Consumptions, which was there a vulgar Disease, He confessed to me, that though his having fallen into it himself, made him very solicitous to find a cure for it; and though he had in his long and various practise, made trial of great variety of Methods and Remedies for the cure of that Disease, yet that with which he cur'd himself, and afterwards the generality of his chief Patiens was principally *Sulphur*

melted

melted, and mingled, in a certain proportion to make it fit to be taken, in a Pipe, with beaten Amber or a Cephalick Herb. The particular circumstances of his Method, I cannot now set you down, not having by me the Paper wherein they were Noted, but if I mistake not the Herb, with which he mingl'd the Brimstone or Flower of *Sulphur* was Coltsfoot or Betony; and I well remember, that what he look'd upon as the chief and specifick Remedy in his way of curing, was the smoak of the *Sulphur*; the other ingredients being added, not so much for their being proper enough for the Disease, as their helping to fill the Pipe, and thereby to allay the pungency, wherewith the Smoak, if afforded by a Pipe fill'd with Brimstone alone, would be qualify'd. But yet this Sulphureous Smoak is so predominant in the Remedy, that he us'd to have a Syrrup in readiness to relieve those, whom the Acrimony of the Fumes should make very sore, and perhaps blister on the one side of their Mouthes, or Throats, which accident he provided for, by that cooling and healing Syrrup; without being thereby discourag'd from prosecuting the cure with the same Remedy; wherewith a person very Curious and Rich, has solemnly assur'd me, that himself has cur'd divers Consumptions, and particularly in a Lady, even in health very Lean, that he nam'd to me, as being one I then knew. Now we know that Physitians generally, and in most cases justly, forbid Acid things to those that have exulcerated or tender Lungs, and how highly Acid and piercing the Smoak of *Sulphur* is, the Chymists can best tell you, who by catching it and condensing it in Glasses shap'd almost like Bells obtain from it that very corrosive Liquor, which readily dissolves Iron, being the very same that is commonly call'd *Oleum Sulphuris per campanam*, and yet it seems that either the Theory of Consumptions is misunderstood, or

that

that the drying quality of the Sulphureous ſteam, and its great power to reſiſt putrefaction, and as it were embalm the Lungs and ſeaſon the Blood are conſiderable enough to account for the Harm which its Acidity may do.

Eeles are ſo commonly eaten by Perſons of both Sexes without being taken notice of for any Quality, except their Crudity, that one would ſcarce believe ſuch a ſtinking and odious Medicine as that of their Livers and Galls dried ſlowly in an Oven ſhould be more proper for any thing, then to make the taker Vomit; and yet *Helmont* in divers places ſpeaks of this Medicine as if it had kept multitudes of Women from dying of hard Labour. And ſince him, *Panarola* in his New Obſervations highly extols it. And I knew a very famous Emperick, who had very few other Secrets, and ſcarce any one ſo great to get Reputation and Mony by. And I remember alſo, That ſome years ſince I had occaſion to give it to the Wife of a very ingenious Phyſitian, of whom the Midwives and her Husband almoſt deſpair'd, and (as ſhe afterwards told me her ſelf) each Doſe made her throwes (which before had left her) returne, and at length ſhe was ſafely delivered ſhe ſcarce knew how. But I found double the Doſe preſcrib'd by *Helmont*, requiſite to be uſed at laſt; and that the quantity of a Walnut of the Powder of theſe Livers given in Rheniſh or White-wine, and when the Stomack was moſt empty, was no more then ſuch a caſe required.

Scorpions being Venomous Creatures, to ſuffocate and infuſe them in Oyl might ſeem the way to make it Poyſonous, if experience did not aſſure us, that this Oyl is ſo far from being ſuch, that it Cures the invenom'd bitings of *Scorpions*, which effect now that Phyſitians find it upon trial to be true, they confeſſe to be rational, and aſcribe it, how

juſtly

justly I now examine not to the attraction of the Poyson received into the Body, by that which is outwardly applied to the hurt. And *Piso* informes us that amongst the *Brasilians*, whose country is so much infested with Venomous Creatures 'tis the most general Cure to draw out the Poyson by applying to the hurt the beaten Body of the Beast that gave it. As likewise in *Italy*, they account the crushing of the very *Scorpion* that has bit a Man upon the bitten place for a most speedy and effectual Remedy. And I remember that here in *England* the Old man, whom you have seen going about with *Vipers, Toads*, &c. to sell, tol'd me that when he was dangerously bitten by a *Viper* and all swel'd by the Poyson of it a great part of his cure was the outward application of Venomous Creatures stamp'd 'till they were brought to a Consistence fit for that purpose.

That *Fluxes* are the general and Endemical Diseases in *Ireland*, I need not tell you; and yet I remember, that having occasion to consult the ancientest and most experienc'd Physitian of that Nation Dr *F.* about the cure of it, he assur'd me, that though during his very long Practice he had found divers Remedies very prosperous, some on one sort of Patients, and some on another; yet the Medicine he most relied on, was this. To take unsalted Butter, and boil it gently 'till a pretty part were consum'd, Skimming it diligently from time to time, whil'st it stands over the fire, and of this Butter melted, to give now and then a considerable quantity, according as the Patient is able to bare it: A Remedy which at the first proposal may seem more likely to put a man into a Flux then to cure him of one. And yet the same Remedy which he suppos'd to benefit by mitigating the sharp humours and preserving the Entrals from their Corrosion was afterwards much commended to me by another

another antient *Iriſh* Phyſitian, who was eſteemed among the Doctors the next in Eminency to him that I have named.

CAP. XIX.

I Should not here, *Pyrophilus*, adde any thing to what I have allready ſaid above in favour of the uſe of even odde Specificks, but that finding at every turn, that the main thing, which does (really or in pretence) prevail with many Learned Phyſitians (eſpecially in a famous Univerſity You have viſited abroad) to reject Specificks, is, That they cannot clearly conceive the diſtinct manner of the Specificks working, and think it utterly improbable, that ſuch a Medicine which muſt paſſe through Digeſtions in the Body, and be whirl'd about with the Maſs of Blood to all the parts, ſhould, neglecting the reſt, ſhew it ſelf Friendly to the Brain, for inſtance, or the Kidnies, and fall upon this or that Juyce or Humor, rather then any other. But to this Objection which I have propos'd as plauſible as I can readily make it, I ſhall at preſent but briefly offer, according to what has been hitherto diſcours'd, theſe two things.

And Firſt, I would demand of theſe Objectors a clear and ſatisfactory, or at leaſt an intelligible explication of the manner of working of divers other Medicaments that do not paſſe for Specificks, as how *Rhubarb* Purges Choler, and *Hellebor* Melancholly rather then other Humours, how ſome Medicines that have endur'd a ſtrong fire, as *Antimonium Diaphoreticum*, and *Bezoardicum minerale* well made, are yet oftentimes ſtrongly Sudorifick; why the infuſion of *Crocus Metallorum* or of Glaſſe of Antimony, though it acquire no pungent, or ſo much as manifeſt taſt, whereby to velicate the

the Palat or the Tongue, are yet violently both Vomitive and Cathartick; And how *Mercury*, which is *innoxiously given in many cases* Crude to Women in labour and others, does easily acquire, besides many other more abstruse Medicinal Qualities, not only an Emetick and Purgative, but a Salivating faculty. For I confesse, that to me, even many of the vulgar Operations of common Drugs seem not to have been hitherto intelligibly explain'd by Physitians, who are yet, for ought I have observ'd, to seek for an account of the manner, how Diureticks, how Sudorificks, how Sarcoticks, and how many other familiar sorts of Medicines, which those that consider them but slightly are wont to think they understand throughly, perform their operations. Nay, I much question, whether the generality of Physitians can yet give us a satisfactory account, why any sort of Medicine purges in general: And he that in particular will shew me, where either the Peripatetick or Galenical Schools, have intelligibly made out, why *Rhubarb* does particularly purge Choler, and *Senna* more peculiarly Phlegm, *Erit mihi magnus Apollo.* For I see not how from those narrow and barren Principles of the four Elements, the four Humours, the four first Qualities (and the like;) Effects, far lesse abstruse then the Operations of Purging Medicines, can satisfactorily be deduc'd. Nor can I find, that any thing makes those Physitians, that are unacquainted with the Philosophy that explains things by the Motions, Sizes, and Figures of little Bodies, imagine they understand the account upon which some Medicines are Purgative, others Emetick, *&c.* And some Purgative in some Bodies, Vomitive in other, and both Purgative and Vomitive in most; but because they never attentively enquire into it.

But (which is the next thing I have to represent) if we duely make use of those fertile and comprehensive Principles of Philosophy, the Motions, Shapes, Magnitudes and Textures of the Minute parts of Matter, it will not perhaps be more difficult to shew, at least in general, that Specificks may have such Operations, as are by the judicious and experienc'd ascrib'd to them, then it will be for those that acquiesce in the vulgar Principles of Philosophy and Physick, to render the true Reasons of the most obvious and familiar operations of Medicines. And though the same Objection that is urg'd to prove, That a Specifick cannot befriend the Kidnies, for Example, or the Throat, rather then any other parts of the Body, lies against the noxiousness of Poysons to this or that determinate part; Yet experience manifests that some Poysons do respect some particular part of the Body, without equally (if at all sensibly) offending the rest: as we see that *Cantharides* in a certain Dose are noxious to the Kidnies and Bladder, Quicksilver to the Throat, and the glanduls thereabouts, *Strammoneum*, to the Brain, and *Opium* to the Animal Spirits and *Genus Nervosum*. And if You call to mind, what we have formerly deduc'd to make it out, That a Humane Body is an Engine, and that Medicines operate in it as finding it so; we need not think it so strange, that there being many Strainers, if I may so call them, of differing Textures, such as the Liver, Spleen, and Kidnies, and perhaps divers local Ferments residing in particular parts, and a Mass of Blood continually streaming through all the parts of the Body, a Medicine may be quickly by the Blood carried from any one part to any other, and the Blood, or any Humour mingl'd with it, may be as easily carried to the Medicine, in what parts soever it be,

and

and the Remedy thus admitted into the Masse of Blood, may in its passage through the Strainers, be so alter'd, either by leaving some of its parts there, or by having them alter'd by the abovemention'd Ferments, or by being associated with some other Corpuscles, it may meet within its passage; whereby the Size, or Figure, or Motion of its small parts may be chang'd, or in a word it may by some of those many other waies, which might, if this ESSAY were not too Prolix already, be propos'd, and deduc'd, receive so great an Alteration, in reference either to some or other of the Strainers, or other firmer parts of the Body, or to the distemper'd Blood, or some other fluid and peccant matter, that it needs not seem impossible, That by that time the Medicine (crumbl'd as it were into Minute Corpuscles) arrives at the *part* or *humour* to be wrought upon, it may have a notable Operation there. I mean *Part as well* as *Humour*, because the Motion, Size, or Shape of the Medicinal Corpuscles in the Blood, though not by sense distinguishable from the rest of the Liquor they help to compose, may be so conveniently qualify'd, as to shape, bulk, and motion, as to restore the Strainers to their right Tone or Texture, as well as the Blood to its free and Natural course, by resolving and carrying away with them such tenacious matter, as stuff'd, or choak'd up the slender passages of the Strainer, or at least Straitned its pores, or vitiated their Figure; And the same Sanative Corpuscles may perchance be also fitted to stick to, and thereby to strengthen such Fibres of the Strainers, or such other firmer parts of the Body, as may need congruous Corpuscles to fill up their little unsupply'd Cavities.

Meats that are Salt, and Tartareous, whilst they are whirled about in the Mass of Blood, may by the other part of that Vital Liquor be so diluted and kept asunder so, as not to be of-

fenſive to any part: When they come to be ſeparated by the *Parenchyma* of the Kidnies, from the ſweeter parts of the Blood, that did before temper and allay them, they eaſily, by their Saline pungency, offend the tender Ureters and Membranous Bladders of thoſe that are troubl'd with the Stone or Strangurie. And perchance 'tis upon ſome ſuch account, that *Cantharides* are more noxious to the Bladder then to other parts of the Body. And as Salt meat thus growes peculiarly offenſive to the Reins and Bladder; ſo a Specifick, diſpos'd to be diſſolv'd, after a peculiar manner, may, in the Body, either preſerve or acquire, as to its Minute parts, a friendly congruity to the Pores of the Kidnies, Liver, or other Strainers equally, when diſtemper'd; as I formerly obſerv'd to You, that New-milk ſweetned with Sugar-candy, though it be not wont ſenſibly to affect any other part of the Body; nor would have ſenſibly affected the Kidnies themſelves, had they not been diſorder'd, yet after the troubleſome operation of *Cantharides*, it had a very friendly effect upon the diſtemper'd Parts; Thus a Specifick, for one Diſeaſe, may be reſolved in the Body into Minute particles of ſuch Figure and Motion, that being fit to ſtick to other Corpuſcles of peccant matter, which, by their vehement agitation, or other offenſive qualities diſcompoſe the Body and make it Feavouriſh, may allay their vehement Motion, and by altering them, as to bigneſs and ſhape, give them new and innocent qualities, inſtead of thoſe noxious ones they had before.

Another Specifick may diſſolve the Groſs and Slimy Humours that obſtruct the narrow paſſages of the Veins; as I have obſerv'd that Spirit of Harts-horn, which powerfully opens other obſtructions, and reſolves ſtuffing Phlegm in the Lungs, will alſo, though more ſlowly, reſolve prepar'd

Flowers

Flowers of *Sulphur*, crude Copper, and divers other Bodies; and alſo it may, by mortifying the Acid Spirit that oftentimes cauſes coagulations in the Blood, reſtore that Vital Liquor to its Fluidity and free Circulation, and thereby remove divers formidable Diſeaſes, which ſeem to proceed from the Coagulation, or Ropineſſe of the Blood; and on the other ſide, the Minute parts of ſome Specificks, againſt a contrary Diſeaſe, may ſomewhat thicken and fix the two thin and agitated parts of the Blood, or of ſome peccant matter in it, by aſſociating themſelves therewith: as the nimble parts of pure Spirits of Wine, and thoſe of high rectify'd Spirit of Urine, will concoagulate into Corpuſcles, bigger and far leſs Agile. And the ſame Spirit of Wine it ſelf, with another Liquor I make, will preſently concoagulate into a kind of ſoft, but not fluid Subſtance. Nor is it ſo hard to conceive, that a Specifick may work upon a determinate Part or Humour, and let the others alone: as if you put, for inſtance, an Egge into ſtrong Vinegar, the Liquor will operate upon and diſſolve all the hard ſhell, and yet leave the tender skin untouch'd; And if you caſt Coral into the common rectify'd Spirit of *Tartar*, the far greater part of the Liquor, though ſtrong and ſpirituous, will remain unalter'd thereby, and may be, *integris viribus*, abſtracted from it; but the Coral will preſently find out, or rather be found out by Acid or Acetuous Particles, and by incorporating it ſelf with them, take away their ſharpneſs: as in ſome caſes Coral has been obſerv'd to do to Sower Humours a bounding in Humane Bodies, thoſe Humours being eaſily, by the Circulating Blood, brought (in their paſſage) to the Coral, whilſt it perhaps remains in the Stomack or Guts. And though the Circulation of the Blood be ſufficient to bring, little by little, the Acid Particles of that Liquor in its paſſage through the

the Vessels to work upon Coral ; yet in other Medicines the Operation may be more nimble: The Remedy quickly diffusing it self through the Mass of Blood, to seek, as it were, and destroy the Acid parts, which it meets with blended with the rest of the Liquor; as Spirit of Urine being instead of Coral put into the above mention'd Spirit of Tartar will not (that I have observ'd) fasten it self to the Spirituous nor the Phlegmatick parts of the Liquor, but only to the Acid ones, which it will Mortifie or deprive of their Sowerness by concoagulating with them. And I see not why it should be more inconceivable that a Specifick should have a peculiar Vertue to free the Body from this or that peccant Humour, and a benign congruity to the distemper'd Spleen or Liver, then that some Cathartick should purge Electively, and some Antidotes have peculiar Vertues against such Poysons, whose Malignity particularly invades the Brain or Kidnies, or some other determinate part: the former of which the Physitians, we reason with, scruple not to teach; and the latter of which is taught us not by them only, but by Experience too.

[Of the credibility of Specificks, and of the Efficacy even of some unlikely ones, we might easily enough present You with more Proofs and Examples: But these may possibly be sufficient for our present purpose; especially if you duely consider, that as Physick has ow'd its beginning to Experience, so those that practise it must enlarge and rectifie their Principles, according to the new discoveries, which are made from time to time of the Operations and Power of the productions, whether of Nature or of Art. This consideration I thought to insist upon in my own Expressions; but finding lately the same Notion which I had, to have been long since that of the ancient Empericks, I will summe up what

I meant to say in their words, as I find them wittily deliver'd by *Celsus*, in that excellent Preface, where having spoken in their Sense of the Origin of Physick, He continues *Sic Medicinam ortam, subinde aliorum salute aliorum interitu perniciosa discernentem a salutaribus: Repertis deinde Medicinæ remediis, homines de rationibus eorum differere cæpisse; nec post Rationem, Medicinam esse inventam, sed post inventam Medicinam, Rationem esse quæsitam.* And least the mistaken name of Emperick should make you undervalue so useful a Consideration, which not the nature of their Sect, but that of the thing, suggested to them; I shall adde in favour of what we have deliver'd concerning experienced, though otherwise unlikely Remedies, that 'tis a sentence ascrib'd to *Aristotle* (and in my opinion, one of the best that is ascrib'd to him,) *Ubi res constat, si opinio adversetur rei, quærendam rationem non rem ignorandam.*]

And certainly *Pyrophilus*, though there be scarce any sort of men, whose credulity may do the World more mischief then that of Physitians; yet perhaps, neither nature nor mankind is much beholden to those, that too rigidly, or narrowly, circumscribe, or confine the operations of Nature, and will not so much as allow themselves or others to try whether it be possible for *Nature* excited and manag'd by *Art* to performe divers things which *they* never yet saw done, or work by divers waies, differing from any, which by the common Principles that are yet taught in the Schools, they are able to give a satisfactory account of.

To the many things which you may be pleased to apply to this purpose, out of the precedent Discourse, divers others may be added, if without tiring you, they may be now insisted on. It would scarce have been believed some ages since, by those that knew no other then Vegetable Purges

and

and Vomits, that a Cup made of a Concret, insuperable by the Heat of Humane Stomacks should, by having for a while, Wine or any such other Liquor, barely powr'd on it to make an infusion, without any sensible diminution of its own bulk or weight, and without any sensible alteration made in the Colour, Taste, or Smell of the Wine, communicate to it a strongly Emetick and Cathartick Vertue, and prove oftentimes Vomitive, ev'n when put up in Clysters; and yet that this is performable by Antimony, slightly prepared with Salt-peter, or without addition, melted into a Transparent Glasse, is commonly known to those that are not Strangers to the Operations of the Antimonial Cup, and of the Glass made of the same Mineral. And much more strange is that which is affirmed by inquisitive Physitians upon their own Trial of the common *Crocus Metallorum*, or somewhat corrected Antimony wont to be sold in Shops, namely, That a few Drachmes of it, infus'd into some ounces of Wine, will make the Liquor work so strongly, as if six or eight times the quantity had been steep'd in it.

Those that believe that all Diaphoreticks must consist of subtle, sapid and fugitive parts, as if only such were easily separated from each other, and agitated by the gentle heat of a Humane body, will scarce expect that any body could, in a moderate Dose, be a good Sudorifick, that is so fixt as to be able to persist divers hours in a good Fire. And yet that *Antimonium Diaphoreticum* is such a Concrete, is now very well known to many besides Chymists.

That a Stone, and a Stone too so fixed, that it will sustaine the violence of reverberated Fire, and is consequently very unlike to be much wrought upon, or digested by the heat of a Humane Stomach, should be capable of agglutinating together the parts of broken bones, would seem impossible

sible to many, but 'tis very well known to those that have made tryal of the efficacy of the *Lapis Ossifragus*: for though I have sometimes wondred at the Fixtness of this Stone, above others, in the Fire, yet being for some days successively drunk in Wine, or *Aqua Symphyti*, to the quantity of about half a Drachme, or more, it doth so wonderfully cement together the parts of broken and well-set Bones, that it deserves the name it commonly hath in the Shops of *Osteocolla*, and hath wonders related of it by several eminent, not onely Chymical, but *Galenical* Writers.

'Tis almost incredible what *Quercetane* relates of what himself saw done with it as to the cure of broken Bones, without much pain or any of the usual grievous Symptoms, within four or five days; so that to the stupendous Vertue he ascribes to this Stone, both inwardly given and outwardly applyed, in the form of a *Poultis*, with onely beaten *Geranium* and Oyl of Roses or Olives, he thinks fit to annex these words: *Quod incredibile videri posset, nisi præter me innumerabiles alii oculati & idonei testes extarent.* And indeed these need good proof to make a wary Man believe so strange a thing, since Chirurgions observe, That Nature is wont to be forty days in producing a *Callus* to fasten together the pieces of a broken Bone. But to make this the more credible by the testimony of Authors more *Galenically* inclin'd, *Matthiolus* relates, That in many the Bones having been very well set (which Circumstance he requires as necessary) have had their broken Parts conglutinated within three or four days: And not only that most experienced Chirurgion *Fabricius Hildanus* us'd it much in Fractures, with onely a little Cinnamon and Suger to make it pleasant; but the Learned *Sennertus*, who somewhere calls its Vertue admirable, thinks it requisite, in his Chirurgery, to give us this caution of it:

Fab. Cent. 3. obser. 90.

Lib. 5. Part. 5. Cap. 1.

Verum in juvenibus & iis qui boni sunt habitus callum nimis auget: Quapropter caute & non nisi in adultioribus exhibendus: The warrantableness of which caution, and consequently the strange efficacy of *Osteocolla*, was, I remember, confirm'd to me not long since by a skilful Physitian who hath particularly studyed its nature; and related to me, That some Years since his Mother, having by a fall broken her Leg near the Knee, had too suddenly, by the over-much use of this Stone, a *Callus* produced in the part much bigger then he expected or desired.

He that, before the salivating Property of *Mercury* was discovered, should have told Physitians of the despondent temper of these, we are now discoursing with, that besides the known ways of disburthening Nature (namely by Vomit, Siege, Urine, Sweat, and insensible Transpiration) there were a sort of Remedies, that would make very large Evacuations by Spittle, and thereby cure divers stubborn Diseases that had been found refractory to all ordinary Remedies, would certainly have been more likely to be derided, then believed by them; since no known Remedy, besides *Mercury*, hath been, that I remember, observed to work regularly by Salivation, (for though *Ceruss* of *Antimony* have been observed to make Men, of some Constitutions, apt to spit much, yet it works that way too languidly, to deserve the name of a Salivating Remedy; and probably oweth the quality it hath of enclining to spit, to the *Mercurial* part of the *Antimony*, wherewith the *Regulus* it is made of abounds) and therefore the greater their experience of the Effects of Medicinal Operations should be supposed to be, the greater indispofition it would give them to credit so unallyed a Truth. And yet the reality of this Fluxing Property of Quick-silver is long since grown past question, and hath been

been found so useful in the cure of the most radicated and obstinate Venereal Distempers, that I somewhat wonder those Physitians, that scruple not to employ as boisterous ways of Cure, have not yet applyed it to the extirpation of some other Diseases; as Ulcers of the Kidnies, Consumptions, and even Palsies, *&c.* wherein I am apt to think, it may be as effectual as in those produced by Lust, and much more effectual then vulgar Remedies, provided that the exceeding troublesome way of working of salivating Medicines be better corrected then it is wont to be, in the ordinary Medicines employed to produce Salivation, which they do with such tormenting Symptomes, that they are scarcely supportable. But if purified Quick-silver be dexterously precipitated by a long and competent digestion, with a due proportion of refined Gold, Experience hath informed us, that the salivating Operation of it may be performed with much less uneasiness to the Patient. And that such *Mercurial* Medicines, wherein the Quick-silver is well corrected by Gold, may produce more then ordinary effects, we have been enclined to believe, by the tryals which we procured by Learned Physitians to be made in other then Venereal Diseases, of a gently working precipitate of Gold and *Mercury*, of which we may elsewhere set you down the Process.

[And now I am upon the Discourse of the peculiar Operations of *Mercury*, and of unusual ways of Evacuation, I am tempted to subjoyn an odde Story, which may afford notable hints to a speculative Man, as it was related to me both in private, and before Illustrious Witnesses, by the formerly commended Chymist of the *French* King: He told me then awhile since, that there is yet living a Person of Quality, by name *Monsieur de Vatteville*, well known by the Command he hath or had of a Regiment of *Swissers* in

France, who, many Years ago following the Wars in the *Low Countries*, fell into a violent Diſtemper of his Eyes, which, in ſpight of what Phyſitians and Chirurgions could do, did in a few Moneths ſo increaſe, that he loſt the uſe of both his Eyes, and languiſh'd long in a confirm'd Blindneſs; which continued till he heard of a certain Emperick at *Amſterdam*, commonly known by the name of *Adrian Glaſmaker* (for indeed he was a Glaſier) who being cry'd up for prodigious Cures he had done with a certain Powder, this Colonel reſorted to him, and the Emperick having diſcourſ'd with him, undertook his Recovery, if he would undergo the torment of the Cure; which the Colonel having undertaken to do, the Chirurgion made him ſnuff up into each Noſtril, about a Grain of a certain *Mercurial* Powder, which, in a ſtrangely violent manner, quickly wrought with him almoſt all imaginable ways, as by Vomit, Siege, Sweat, Urine, Spitting and Tears, within ten or twelve hours that this Operation laſted, making his Head alſo to ſwell very much: But within three or four days after this ſingle taking of the Draſtick Medicine had done working, he began to recover ſome degree of Sight, and within a Fortnight attained to ſuch a one, that he himſelf aſſur'd the Relater, He never was ſo Sharp-ſighted before his Blindneſs. And the Relater aſſured me, that he had taken pleaſure to obſerve, That this Gentleman, who is his familiar Acquaintance, would diſcern Objects farther and clearer then moſt other Men. He added, That *Monſieur de Vatteville* told the Relater, he had purchaſ'd the way of making this Powder of the Emperick, and had given it to an eminent Chirurgion, one *Benoeſt* (an Acquaintance of the Relaters) by whom he had been cured of a Musket-ſhot that had broken his Thigh-bone, when the other Chirurgions would have proceeded to amputation; and

and that this *Benoeſt* had with this Powder, adminiſtred as before is related, cur'd a Gentlewoman of a *Cancer* in the Breaſt. All which, and more, was confirm'd to the Relater by the Chirurgion himſelf. But in what other ſtubborn and deplorable Caſes they uſe this Powder, I do not particularly remember. The Preparation of it, which a Chymiſt did me the favor to tell me by word of mouth, as a thing himſelf had alſo made, was in ſhort this: That the Remedy was made by precipitating Quick-ſilver, with good Oyl of Vitriol, and ſo making a *Turbith*, which is afterwards to be dulcified by abſtracting twenty, or twenty five, times from it pure Spirit of Wine, of which freſh muſt be taken at every abſtraction. But I would not adviſe you to recommend ſo furious a Powder to any, that is not a very skilful Chymiſt and Phyſitian too, till you know the exact Preparation, and particular uſes of it; the reaſon of my mentioning it here, being but that which I expreſſed at the entrance upon this Narrative.]

CHAP. XX.

YOu will perchance wonder, *Pyrophilus*, that having had ſo fair an opportunity as the ſubject of this Eſſay afforded me, of diſcourſing to you about the Univerſal Medicine, which many *Paracelſians*, *Helmontians*, and other Chymiſts talk of ſo confidently: I have ſaid nothing concerning the exiſtence, or ſo much as the poſſibility of it. But till I be better ſatisfied about thoſe Particulars then yet I have been, I am unwilling either to ſeem to believe what I am not yet convinced of, or to aſſert any thing, that may tend to diſcourage Humane Induſtry; and therefore I ſhall onely venture to adde on this occaſion, That I fear we do ſomewhat

too

too much confine our hopes, when we think, that one generous Remedy can scarce be effectual in several Diseases, if their causes be supposed to be a little differing. For, the *Theory* of Diseases is not, I fear, so accurate and certain as to make it fit for us to neglect the manifest or hopeful Vertues of noble Remedies, where ever we cannot reconcile them to that *Theory*. He that considers what not unfrequeutly happens in distempered Bodies by the *Metastasis* of the Morbifique matter (as for instance, how that which in the Lungs caused a violent cough removed up to the head may produce (as we have observed) a quick decay of Memory and Ratiocination, and a Palsie in the Hands and other Limbs) may enough discerne that Diseases that appear very differing, may easily be produced by a peccant matter of the same nature only variously determined in its operations by the constitution of the parts of the body where it setleth: and consequently it may seem probable to him, that the same searching Medicine being endowed with qualities destructive to the texture of that Morbifique matter, where ever it finds it, may be able to cure either all, or the greatest part, of the Diseases which the various translation of such a Matter hath been observed to beget. Moreover, it oftentimes happens that Diseases, that seem of a contrary nature, may proceed from the same cause variously circumstantiated; or (if you please) that of divers Diseases, that may both seem primary, the one is but Symptomatical or at most Secundary in relation to the other; as a Dropsy and a slow Feaver may, to unskilfull men, seem Diseases of a quite contrary nature, (the one being reputed a hot and dry, the other a cold and moist Distemper) though expert Physitians know they may both proceed from the same Cause, and be cured by the same Remedy: And in women experience manifests, that a great variety of

of differing Distempers, which by unskilful Physitians have been adjudged distinct and primary Diseases, and have been, as such, unsuccessfully dealt with by them, may really be but disguised Symptomes of the distempers of the Mother or *Genus Nervosum*; and may, by Remedies reputed *Antihysterical*, be happily removed. To which purpose I might tell you, *Pyro*. That I, not long since, knew a Practitioner, that with great success used the same Remedies (which were chiefly Volatile and Resolving Salts) in Dropsies, and in (not, Symptomatical, but) Essential Feavers. And our selves have lately made some Experiments of not much unlike nature, with a preparation of Harts-horn, of equal use in Feavers and Coughs, both of them primary. I might on this occasion recur to divers of the Remedies formerly mentioned in several places of this Essay; since divers of them have been found effectual against Diseases, which, according to our common Theory, seem to be little of kin one to another: And by telling you what I have observed concerning the various operations of *Helmont's Laudanum*, of our *Ens Veneris*, and even of a Medicine devised by a Woman, the Lady *Kents* Powder, I might illustrate what I have lately delivered: But it is high time for me to pass on to another Subject; and therefore I shall rather desire you, in general, to consider, whether or no several Differing Diseases, and ev'n some commonly supposed to be of contrary natures, be not yearly cured by the *Spaa waters* in *Germany*.

And to assist you in this Enquiry, I shall address you to the *rare Observations* of the famous and experienc'd *Henricus ab Heer*, and to his *Spadacrene*; in the 8th Chapter of which he reckons among the Diseases which those Waters cure, Catarrhs, and the Distempers, which (according to him) spring from thence; as the Palsie, Trembling of the Joints,

and

and other Diſeaſes of kin to theſe, Convulſions, *Cephalalgiæ*, (I name them in the order, wherein I finde them ſet down) *Hemicraniæ*, *Vertigo*, Redneſs of the Eyes, of the Face, the *Eryſipelata*, *Ructus continui*, *Vomitus*, *Singultus*, Obſtructions, and even Scyrhus's, if not inveterate, of the Liver and Spleen, and the Diſeaſes ſpringing thence; the Yellow Jaundiſe, *Melancholia flatulenta ſeu Hypochondriaca*, Dropſies, Gravel, Ulcers of the Kidnies, and *Caruncula in meatu urinario*, *Gonorrhœas*, and reſembling affections, *Elephantiaſis* or the Leproſie, *fluor albus mulierum*, Cancers and Scyrrhus's of the Womb, Fluxes and even Dyſenteries; the Worms (though very obſtinate, and ſometimes ſo copious as to be voided in his preſence, even with the Urine) Sterility, and not onely the *Scabies* in the Body and Neck of the Bladder, and clammy pituitous Matter collected therein, beſides Ulcers in the *Sphyncter* of it: but he relates, upon the repeated Teſtimony of an eminent Perſon that he names, and one whom he ſtiles *Vir omni fide digniſsimus*, That this Party being troubled with a very great Stone in his Bladder, and having had it ſearch'd by divers *Lythotomiſts*, before he came to the *Spaa*, did, by very copiouſly drinking theſe Waters, finde, by a ſecond ſearch made by thoſe Artiſts, that his Stone was much diminiſhed the firſt Year, and (by the ſame way of tryal) that it was ſo the ſecond Year. And of the Cures of theſe Diſeaſes, the Phyſitian mentions in the ſame Chapter, as to many of them, particular and remarkable Inſtances; and in the beginning of the next Chapter, having told his Readers that he expects they ſhould ſcarce believe theſe Waters can have ſuch variety of Vertues, *Cæterum*, ſaith he, *ſi in* Spaa *maturè & conſtantibus naturalibus, vitalibuſq; facultatibus venerint; aquaſq; quo dicemus modo biberint, indubiè quæ dixi, vera eſſe fatebuntur*: And though

though we be not bound to believe (nor doth he affirm it) that the *Spaa*-waters do *universally* cure all the afore-mention'd Distempers; yet it is very much, and makes much for our present purpose, that they should in so many Patients cure most of these Distempers, and lessen, if not cure, the rest. And we may somewhat the better credit him, because even where he reckons up the Vertues of the *Spaa*, he denys it some, which other Physitians ascribe to it. And it is very considerable, what he subjoyns in these words: *Paucissimos enim vel nullos Spadæ Incolas Capitis doloribus, Cardialgiâ, Calculo, Obstructionibus renum, Hepatis, Lienis, Mesaraicarum, laborantes invenies, Ictericos, Hydropicos, Podagricos, Scabiosos, Epilepticos, quod sciam, nullos.* But that which I most desire you to take notice of, is, That besides all the above-mention'd Diseases, I finde that he ascribes to these Waters the Vertues of curing such as are counted of a contrary nature, and are thought to require contrary Remedies: For besides that, he expresly affirms, in the beginning of the eighth Chapter, That these Waters being endow'd with the Vertues both of hot and cold Minerals, they cure both hot and cold affections, in the same Patients, and in differing Bodies, and that contrary Effects are performed by them: He hath, after some Pages, this passage, which may go for an Illustrious Proof of what he had asserted: *Inter cætera* (saith he, speaking of the *Spaa*-Waters) *Mensibus movendis imprimis idonea, quod millies experientia comprobavit. Et tamen nimium eorum fluxum quovis alio medicamento felicius sistit.*

These Testimonies, *Pyrophilus*, of our experienc'd Author, would perhaps obtain the more credit with You, if You had seen what I lately had the opportunity to observe in a hot and dry Season, at our own *Tunbridge*-Waters in *Kent*, when

I was there to drink them. And therefore I shall again invite You not onely to consider, Whether one potent Remedy, such as it may be, may not be able to cure variety of Diseases, and some suppos'd to be of contrary natures? But whether or no divers Persons, on whom the received *Methodus medendi* hath been long and fruitlesly employ'd, be not by their tyred and despondent Physitians themselves sent thither, and there cur'd of their abstruse and obstinate Diseases, by Remedies prepar'd by Nature without the assistance of Art? For if you duly reflect on this conspicuous Observation, and consider how much it is possible for Art to meliorate and improve most (especially Mineral) Remedies, afforded us by Nature, you would probably dare to hope, That Medicines might be prepared of greater Efficacy, and applicable to more Diseases, then they who think the more received Theory of Diseases (from which yet very eminent Physitians, in divers Particulars, scruple not to recede) incapable of being rectified; and that judge of all Remedies by them, that are publickly Venal in Apothecaries Shops, will allow themselves so much as to hope.

If now You demand, *Pyrophilus*, if I think that every Particular which hath contributed to swell this Discourse into a bulk so disproportionate to that which the Title of an Essay promised, do directly belong to the Art of Physick? I shall leave it to the Judicious *Celsus* (whom Learned Men have stiled *The Roman Hippocrates*) to answer for me, and he will tell you, That *Quanquam multa sint ad ipsas artes non pertinentia, tamen eas adjuvant excitando artificis ingenium.* I suppose I need not remind You, *Pyrophilus*, that it was not my design, in what hath been represented, to subvert those Principles of the *Methodus medendi*, from which no sober Physitians themselves recede, and in which they unanimously

mouſly acquieſs: And that I much leſs intend to countenance thoſe venturous Empericks, who, without any competent knowledge of Anatomy, Botanicks, and the Hiſtory of Diſeaſes, think Receipts or Proceſſes alone can enable them to cure the Sickneſſes they know not, and who would perſwade Men to lay by, as needleſs, a Profeſſion, of whoſe Uſefulneſs to Mankinde we may elſewhere have occaſion to diſcourſe. No, *Pyrophilus*, without peremptorily aſſerting any thing, I have but barely repreſented the Notions I have mention'd concerning the *Methodus medendi*, as things probable enough to deſerve to be impartially conſidered; That in caſe they prove fit to be declin'd, they may appear to have been rejected not by our ſuperciliouſneſs or lazineſs, but (after a fair tryal) by our experience: And in caſe they ſeem fit to be approved, they may prove additional Inſtances of the Uſefulneſs of *Natural Philoſophy* to Phyſick. Which Uſefulneſs, *Pyrophilus*, if I have in any conſiderable meaſure been ſo happy as to make out, I ſhall not think the time (and much leſs the pains) I have beſtow'd upon that Theme, miſſpent. For, I muſt confeſs to you, *Pyrophilus*, that to me it ſeems, that few things ought more to endear to us the Study of *Natural Philoſophy*, then that (according to the Judicious Sentence of our *Celſus*, *Rerum Naturæ contemplatio*, ſaith he, *quamvis non faciat Medicum*, *aptiorem tamen Medicinæ reddit*) a deeper inſight into Nature may enable Men to apply the Phyſiological Diſcoveries made by it (though ſome more immediately, and ſome leſs directly) to the Advancement and Improvement of Phyſick.

And I well enough know, *Pyrophilus*, that if inſtead of Writing this Eſſay to ſuch an one as You, I ſhould Write it to the more critical and ſeverer ſort of Readers, they would be apt to think both that it is impertinent for me, who do not

profeſs to be a Phyſitian, to treat prolixly of Matters Medicinal; and that it may appear ſomewhat below me, in a Book, whoſe Title ſeems to promiſe you Philoſophical Matters, to inſert I know not how many Receipts: But I ſhall not ſcruple to tell ſuch a Perſon as *Pyrophilus*, That ſince my Method requir'd that I ſhould ſay ſomething to you of the *Therapeutical* part of Phyſick, I thought that Chriſtianity and Humanity it ſelf, oblig'd me not to conceal thoſe things; wch how deſpicable ſoever they may ſeem to a ſpeculative Philoſopher, are yet ſuch, as, beſides that *ſome* of them may perhaps afford improveable Hints touching the Nature of Remedies, if not alſo of Diſeaſes, Experience hath encouraged me to hope, that *others* may prove uſeful to the ſick. And as for the inſerting of Receipts, even in Books of Philoſophical Subjects, I have not done it altogether without example. For not onely *Pliny*, a Perſon of great Dignity as well as Parts, and Friend to one of the greateſt *Roman* Emperors, hath left us in a Book, where he handles many Philoſophical Matters, ſtore of particular Receipts; but our great Chancellor, The Lord *Verulam*, hath not diſdain'd to Record ſome. And as for that Induſtrious Benefactor to Experimental Knowledge, the Learned and Pious *Merſennus*, his Charity made him much more fearful to neglect the doing what good he could to others, then to venture to leſſen his Reputation by an *Indecorum*, that in a Mathematical Book, and in a Chapter of Arithmetical Combinations, he brings in not onely a Remedy againſt the *Erysipelas*, but even a Medicine for Corns, where he tells us, That they may be taken away, by applying and daily renewing for ten days, or a fortnight, the middle Stalk that grows between the Blade and the Root (for that I ſuppoſe he means by the unuſual Word *Thallum*) of Garlick, bruiſ'd. Nor is

it

it without Examples, though somewhat contrary to my Custom in my other Writings, that in this, and the four precedent Essays, I have frequently enough alledged the Testimonies of others, and divers times set down Processes or Receipts, not of my own devising. For even among professed and learned Physitians, scarce any thing is more common, then on Subjects far less of kin to Paradoxes, then most of those I have been discoursing of, to make use of the Testimonies and Observations of other approved Writers, to confirm what they teach. And not now to mention the voluminous Books of *Schenkius* and *Scolzius*, that famous and experienc'd Practitioner. *Riverius* himself, hath not been ashamed to publish together a good number of Receipts, given him by others, under the very Title of *Observationes communicatæ*: And *Henricus ab Heer*, hath, among his *Observationes oppido raræ*, divers Receipts that came from Mountebancks, and even Gypsies. And therefore I hope that you, who know that it is not after every Body that I would so much as relate an Observation, or mention a Medicine, as thinking them probable, will easily excuse one that hath much fewer Opportunities then a profess'd Physitian to try Remedies himself; if treating of Subjects not so familiar, I choose to countenance what I deliver by the Testimonies of skilful Men, and if I scruple not to preserve in these Papers some not despicable Remedies, as well of abler Men as of my own, that otherwise would probably be lost. But of this Practise I may elsewhere have occasion to give you a more full Apology, by shewing how much it may conduce to the enriching and advancement of Physick; an Art, with whose praises I could long entertain You, if I were at leisure (and durst allow my self) to exhaust common places.

And yet give me leave to tell you, That Man is so noble a Creature,

a Creature, and his Health so requisite to his being able to relish other goods; and oftentimes also to the comfortable performance of what his Conscience, his Country, his Family, his Necessities, and perhaps his allowable Curiosity challenge from him, that I wonder not so much at those Antient Heathens, that being Polytheists and Idolaters, thought themselves oblig'd, either to refer so useful an Art as that of Physick, to the Gods or God-like Persons; or to adde those, that excell'd in so noble a Faculty, to the number of those they worshipp'd. For my part, *Pyrophilus*, a very tender and sickly Constitution of my own, much (impair'd by such unhappy Accidents as Falls, Bruises, *&c.*) hath, besides (as I hope) better motives of Compassion, given me so great a sense of the uneasinesses that are wont to attend Sickness, that I confess, if I study Chymistry, 'tis very much out of hope, that it may be usefully imploy'd against stubborn Diseases, and relieve some languishing Patients with less pain and trouble, then otherwise they are like to undergoe for Recovery. And really, *Pyrophilus*, unless we will too grosly flatter our selves, we can scarce avoid both discerning and deploring the ineffectualness of our vulgar Medicines, not onely *Galenical*, but Chymical; (for an active Body may yet be but a languid Remedy.) For besides that many that recover upon the use of them, endure more for Health, then many that are justly reckon'd among Martyrs, did for Religion; Besides this, I say, we daily meet with but too many in the case of that bleeding Woman, mention'd in the Gospel, of whom 'tis said, That she had suffer'd many things of many Physitians, and had spent all that she had, and was nothing better'd, but rather grew worse. And therefore I reckon the investigation and divulging of useful Truths in Physick, and the discovering and recommending of good Remedies among the greatest and most

Mark 5. 26.

most extensive Acts of Charity, and such, as by which a Man may really more oblige Mankinde, and relieve more distressed Persons, then if he built an Hospital. Which perhaps you will not think rashly said, if you please but to consider, how many the knowledge of the Salivating, and other active Properties of *Mercury*, and of its enmity to putrefaction and Distempers springing thence, have cur'd of several Diseases, and consequently how many more Patients, then have recover'd in the greatest Hospital in the world, are oblig'd to *Carpus* and those others, who ever they were, that were the first discoverers of the medical efficacy of *Quick silver*. And for my own particular, *Pyroph.* though my Youth and Condition forbid me the practice of Physick, and though my unhappy Constitution of Body, kept divers Remedies from doing me the same good they are wont to do others; yet having more then once, *prepar'd*, and sometimes occasionally had opportunity to *administer*, Medicines, which God hath been so far pleas'd to bless on others, as to make them Relieve several Patients, and seem (at least) to have snatch'd some of them almost out of the jaws of death; I esteem my self by those successes alone sufficiently recompenc'd for any toil and charge my Enquiries into Nature may have cost me. And though I ignore not, that 'tis a much more fashionable and celebrated Practice in young Gentlemen, to kill men, then to cure them; And that, mistaken Mortals think it the noblest Exercise of vertue to destroy the noblest Workmanship of Nature, (and indeed in some few cases the requisiteness and danger of *destructive valour* may make its Actions become a vertuous Patriot) yet when I consider the Character, given of our great Master and Exemplar, in that Scripture, which says, *That he went about doing good, and Healing all manner of Sickness; and all maner of Disease among the people,*

Acts 10. 38. *Mat.* 4. 24.

ple, I cannot but think such an Imployment worthy of the very noblest of his Disciples. And I confess, that, if it were allow'd me to envy creatures so much above us, as are the Celestial Spirits, I should much more envy that welcome Angels Charitable imployment, who at set times diffus'd a healing vertue through the troubled waters of *Bet esda*, then that dreadful Angels fatal imployment, who in one night destroy'd above a hundred and fourscore thousand fighting men. But, of the Desireableness of the skill and willingness to cure the sick, and relieve not only those that languish in Hospitals, but those that are rich enough to build them, having elsewhere purposely discoursed, I must now trouble you no longer on this Theme, but Implore Your much needed pardon for my having been (beyond my first intentions) so troublesome to You already.

John 5. 14.
2 *Kings* 19. 35.

AN

AN APPENDIX TO THE FIRST SECTION OF THE Second Part.

Advertisements touching the following APPENDIX.

I Scarce doubt, but it will be exspected that I should annex to the foregoing Treatise, those Receipts and Processes, which seem to be here and there promis'd in it; But I desire it may be considered, that some Passages, which an unattentive Reader may have mistaken for absolute Promises, are indeed but Profers conditionally made to a particular Person; and so not engaging me, till the condition (which was his desiring the things mention'd to him) be on his part perform'd. And as for the other things, which every Reader may suppose to be promis'd Him, I have at hand this general excuse, that at least I promis'd nothing to the Publick; whatever promises I may have made in the foregoing ESSAYES, having together with them been address'd to a private Friend. And I have two or three special Reasons to insist on this Excuse, for divers of my choicer Books and Papers having not long since unhappily miscarried through the negligence of some Men, or the Fraud of others, it is not now possible for me to retrieve some of the things I was Master of, when I promis'd them. And then to revise carefully all the Papers that remain in my hands of Affinity with the past Treatises, would take up more time then is allow'd me by other Studies and Employments, which I think of greater moment, or at least wherein I am much more concern'd, then to give this Book at present a full or accurate APPENDIX.

But though I might upon these and other Reasons wholy excuse my self from the trouble of adding any Appendix; yet because the communicating of good Medicines, is a work of Charity, and those unpolish'd and immethodical Notes that may perchance disparage an Author, may yet relieve many a Patient, I am willing to do what my occasions will permit, and finding among my Papers many loose Sheets, concerning Spirit of Harts-horn, Blood, *&c.* written divers years since to a Friend, I choose rather to publish them just as I find them with *Pyrophilus*'s name, employ'd in convenient places, and to adde some unpromis'd Receipts, instead of those that are lost, then be altogether wanting, to what may be expected from me. I know that what I deliver concerning some of the following Preparations may by severer Criticks be thought somewhat unaccurate, and I confess I am of that mind my self. But meeting with these Collections in loose Sheets among my old Papers, I must either publish them as I find them, or take the pains to Polish and Contract them, which would require more time, then I can at present afford them. And much less can I stay to subjoyn the Histories of the particular cures perform'd by the Medicines, whose preparations I set down, though divers of them would not perhaps appear inconsiderable. But if I find by the entertainment of these Papers, that it will be worth while to revise or enlarge them, I may, God permitting, be invited to do it, and either supply the things, that are here deficient out of After-observations) or Papers now out of the way, or make amends for their omission in substituting better things.

It will not at all surprize me if some Readers think me too prolix in delivering the preparations of Harts-horn, *Ens Veneris* &c. with such particular and circumstantial Observations. But my design being to gratifie and assist those that

that would make and use the Remedies I recommend: The Experience I have had, of the difficulties most men find in the preparing things by the Direction of Chymical Processes not very expressly set down, makes me apt to hope, that (I say not the great Physitians or Chymists, who may if they please, leave them unperus'd; but) those for whom I principally intend my Directions will think my having made them so particular a very excusable fault. And I make the lesse difficulty to suffer such things as perhaps I judg to be in comparison of others, but trifles to passe abroad, because finding of late Years, that many Persons of Quality of either Sex, who scarce read any other then English Books, have (as I hope) out of Charity or Curiosity or both, begun to addict themselves to Chymistry, and venture to be tampering with Spagirical Remedies, it may not be unseasonable to supply them with some Preparations, that may both save them time and charges, and put them upon the use of Remedies, which without being languid, are, if any thing discreetly given, safe and innocent, and wherein a little Error, either in the making or the administring will be far lesse prejudicial to the sick, then if it were committed in the more vulgar (oftentimes, either falsly or obscurely prescrib'd) preparations they are wont to make of Acid Salts, Mercury, Antimony, and other Minerals, whose Activity for the most part makes them need to be skilfully prepar'd, and judiciously given.

To

To the Eightieth Page.

The Irish Lithotomists *Receipt, for the Stone in the Bladder.*

REc. *Aquar. Melon. Citrullor, Filipendulæ, Petroselin, syr. è 5 radicibus, syr. de Bïsantiis, ana, unc. ij Oxymelit comp. unc. j. misce, quartam mixti partem sumas manè jejunus, & postea per octo horas à cibo & potu abstineas, aliam sumas partem eodem die post coenam cum lectum intrare volueris; deniq; sequenti die reliquæ sumantur partes ut primæ; tertio verò die.*

Rec. *Elect. lenit. dragm. iii. syr. Rosat. solut. dragm. ij. pulp. Tamarind. dragm. j. misceantur ac in seri lactis unc. iij. dissolvantur: totum bibas mane quatuor horis ante jus, quarto die sumas mane sequentis pulv. dragm. j. mixti in sequentis Apozematis unc. iiij. & olei Amygd dulc. unc. sem.*

Rec. *Cinerum vitri *, & Scorpionum pulveris, Lapid. Spongiæ, & lap. Judaici, Acori, sem Altheæ, Millii solis, Saxifragii ana dragm. i. sem lactucæ, 4 sem. frigid majorum ana dragm. sem. Trokiscor. Alkekengi, rad. pimpinellæ ana dragm. ii, fiat pulvis subtilis.*

Apozema.

Rec. *Parietariæ, rad Alth. ana Mj sem. petroselini, Glychyrrhizæ ana unc. sem. halicacabi, unc. j. Coqu in aq. pluviæ, sext. 2. & vini albissimi sext. i. ad meditetatis consumptionem, & colatura melle hybernico dulcoretur.*

Tum quarto illo die passerculum Trogloditem sale antea conditum edas una cum cæna, Et post coenam lumbi, pubes, & tota renum regio oleis è granis Citri & scorpion. liniantur, etsi possibile esset prædicta olea per meatum urinar. in vesicam injiciantur, sicq; deinde pulvere, Apozemate, Troglodite & Oleis

oleis omni die utere, donec arenulæ aut lap. fragmenta una cum expulsis apparuerint.

Loco cinerum vitri sumi possunt cineres Camini & vires cinerum scorpionum supplere potest pulvis lumbricor. terrestr. probè in vino lotorum & postea exsiccatorum.

* *NB.* [As far as I could conjecture by the Discourse I had with the owner of the Receipt, by Ashes of Glass he meanes the superfluous Saline substance, which the Glassemen are wont to call *Sandiver*; but because he did not explain himself so clearly, and we know not yet a way of Burning Glass to Ashes, I think it will be most advisable to substitute the Wood Ashes, which in the Receipt it self towards the close of it are appointed for a *Succedaneum.*]

To the One Hundred and Twentieth Page;

[*Where the Vertues of the* Pilulæ Lunares *are toucht at.*]

THe great benefit that has redounded to many patients, from the use of the *Silver Pils*, here briefly mention'd, and commended, invites me to communicate as a considerable thing, the preparation of them, of which I do not pretend to be the Inventer; having divers years since, learnt it by discoursing with a very Ancient and experienc'd Chymist, whose name that I do not mention, will perhaps seem somewhat strange to those Readers that have observ'd me not to be backward in acknowledging my Benefactors in point of Experiments, and therefore I hold it not amiss to take this opportunity of declaring once for all, that twere oftentimes more prejudicial then grateful to one that makes an advantage by the Practise of Physick, to annex in his life

time

time his name to some of his Receipts or Processes; because that when a Man has once got a repute, for having a Specifick in any particular Disease or Case, his Patients, and their Friends will hardly forbear to apply themselves to him for that Medicine, though the same Medicine, but not known to be the same, should be made use of by a stranger, or divulged in a Printed Book. Most Patients being not apt to rely upon Medicines, that come onely that way recommended; whereas if it were known that the Printed Receipt is the self same, which the Physitian employs, not only other Physitians would quickly make as much advantage of it as he, but many Patients would think themselves by that discovery dispens'd with, in point of good husbandry, from going to any Physitian at all, as knowing before hand the best prescription they are like to receive from him. The *Process* of the *Pilulæ Lunares* is this;

Take of the best refined Silver as much as You please, dissolve it in a sufficient quantity of cleans'd spirit of Nitre or *Aquafortis*, then evaporating away the superfluous moysture, let the rest shoot into thin Chrystals; these you may in some open mouth'd Glass place in sand, and keep in such a degree of Heat, that by the help of very frequently stirring them, the greatest part of the more loose and stinking Spirits of the *Menstruum* may be driven away, and yet the remaining Chrystals not be brought to Flow: These Chrystals of Silver you must counterpoise with an equal weight of Chrystals of Nitre; and first dissolving each of them apart in distill'd Rain-water, You must afterwards mingle the Solutions, and abstract or steam away the superfluous moysture, till the remaining Mass be dry, which you must keep in an open Glass, expos'd to such a temperate heat of Sand, that the Matter may not melt (which you must be very careful

ful of) and that yet the adhering corrosive Spirits of the *Menstruum* might be driven away. And to both these ends You must from time to time stir the Mass, that new parts of it may be expos'd to the Heat, and new ones to the Air, till you cannot descry in the remaining white Powder any offensive scent of the Spirit of Nitre, or of the *Aqua-Fortis*. And lastly You must take the Crum of good White-bread, made with a little moysture into a stiff Past, and exactly mingle with the newly mention'd Magistery or Powder as much of this Past, as is necessary to give it the consistence of a Mass of Pills, which you may thence form at pleasure, and preserve in a well stopp'd Glass for use.

NB. First the Silver employ'd in this Operation, ought to be very pure and more exquisitely refin'd, then much of that is wont to be, which here in *England* is bought for fine Silver; for if the Copper wherewith Silver-Coyns are wont to be alloy'd, be not carefully separated upon the Cupel, it may, being turn'd by the Acid *Menstruum* into a kind of Vitriol, when it is taken into the Body, either provoke Vomits, or otherwise discompose it.

2ly, The Spirit of Nitre, or (which in our case comes almost to one) the *Aqua-fortis* that is us'd about this Medicine, ought to be clear'd, as our Refiners phrase it, before the Silver be put in, for (as I elsewhere Note) in Salt Peter, there is oftentimes an undiscerned Mixture of Sea-salt, whose Spirit coming over in Distillation with that of the Nitre, is apt to precipitate the Silver, which the Spirit of Nitre has dissolv'd. This I take to be the Reason of that practise of the best Refiners to purifie their *Aqua-fortis*, by casting in some small piece of Silver, that they may afterwards securely put into it greater Quantities of the same Mettal to be dissolv'd. For the Saline Spirits fall to the bottome, toge-

ther with the corroded Silver, which they precipitate as long as there is any of these Saline Spirits left in the *Menstruum*, which after this may be decanted clear; and though you had put a little more Silver then needed to it, it neither does harm, nor is lost, the *Aqua fortis* preserving none unprecipitated, but what there were no more Saline Spirits to work upon, so that the superfluous Silver put in is already dissolv'd to Your hand.

3dly, The dry Mixture obtain'd from the Solutions of Chrystals of Nitre and Chrystals of Silver, must be often stirr'd, and kept longer in the Sand, before all the offensive Spirits will be driven away, then till Experience had inform'd me, I did imagine.

Fourthly, If the Chrystals of Silver be considerably Blew or Green, 'tis a sign the Silver was not sufficiently purg'd from Copper, else the Mixture we have been speaking of, will look of a White, good enough. And possibly 'twas by reason of the not being careful to take sufficiently Refin'd Silver, and of the not knowing how to improve the Chrystals of Silver, by the addition of those of *Nitre*, and especially how to free them from the stinking and Corrosive Spirits of *Aqua-fortis*, that it is come to pass, that though there be in some Chymical Writers, Processes not very unlike this, yet the Chrystals of Silver have been censur'd and laid aside as not alwaies safe even by those, who otherwise much magnifie the Efficacy of those they us'd.

Fifthly, When You are about to make up this Mixture with the Crum of Bread into a Mass, and so into Pills, 'twill not be amiss to dispatch that work at once, for usually it leaves an ugly Blackness on the Fingers, that cannot under divers daies be gotten off.

Sixthly,

Sixthly, In taking of the Pills care must be had, that they be sufficiently lapp'd up either in a Wafer wetted with Milk, or the Pulp of a Roasted Apple, or some such thing, that they may not touch the Palat, or the Throat, because of the extreme and disgusting bitterness, which is to be met with in the Chrystals of Silver, and which is not the least thing, that with nicer Persons does Blemish these Pills.

Seventhly, The Dose is somewhat uncertain; because they work much according to the Constitution of the Body, and especially according as it abounds with Serous Humours; Wherefore 'tis adviseable to make the Pills of the size of very small Pease, of which one given at Bedtime, is a sufficient Dose for some Bodies, others will require two; and in some we must ascend to three; and if the Patient be Hydropical, or be otherwise much molested with serous Humours, it is observable that sometimes one Dose will work two Daies, or four Daies, (may be five or six) successively, but yet moderately and usually, without weakening the Patient, in proportion to such copious Evacuations.

Eighthly, Besides the Dropsie, wherein we have mention'd this Remedy as a Specifick, it often proves very available in other Cases, wherein Men are troubled with Serous Humours. But the first distempers, which I heard it Magnified for, were those of the Head, and *Genus Nervosum*; and a great *Virtuoso* of my acquaintance that inherits a Disposition to the Palsie, has several times told me, that if when he begins to find himself disordered, he take a Dose of these Pills, he is thereby constantly reliev'd. But of the particular Cases, wherein we have had opportunity to take notice of their Effects, we have not now, but may perchance another time have leisure to entertain You.

Lastly, That skilful and succesful Chymist Dr *N. N.* who doth much both use and esteem this Remedy, being desir'd by me to let me know, if he had any Objections against it, informes me, that when he hath given these Pills oftentimes, and without intervalls, though they did not either Salivate or Vomit, or much weaken the Patient, yet they would at last be attended with a kind of Incipient *Leucophlegmatia*, which he easily prevents by intermitting for a while the use of the Pills, after every second or third time that he administers them, and giving, when he exspects it to be requisite, some *Crocus Martis*, Extract of *Juniper*, or other Astringent or Hepatick Medicines to corroborate the *Viscera* and preserve their Tone.

To the One Hundred Twenty third Page.

(Where mention is made of the Cure of one concluded to have a Gangrene, by an inward Medicine.)

THe Cure mention'd in this place, having been perform'd by that Medicine, which from the Name of that Great Commander, as well as Virtuoso, who was the Author of it, passes under the Name of Sr *Walter Rawleighs* Cordial, and this being but one of many remarkable (and some of them stupendous) Cures which have been wrought by it from time to time, especially of late that it hath been more us'd, I am induc'd to annex here the yet unpublish'd Receipt, partly, because there are divers Receipts that are each pretended to be the true, magnify'd by their several Possessors; And I had the liberty of looking it out in a Receipt-Book, preserved by the Authors Son; and partly because, though I will not affirm, that a skilfuller or more promising Composition of

of the same Ingredients could not have been devised; Yet the following Receipt has been abundantly recommended by Experience. And I remember, that but a while since, a Person of Note having sent to me, to desire a taking of this Cordial for a certain Knight, who after all that Skilful Physitians could do, had long lain a dying; I the other day chanc'd to meet this Knight at *White-hall*, well, lively, and with a Face whose Ruddiness argued a perfect Recovery, and yet he is not very farre from seventy Years of Age, and had before he grew so ill, long conflicted with a tedious Ague, and feaver, which had reduc'd him to that Extremity, when the Cordial was brought, that, as himself told me, he neither was sensible when they gave it him, nor had known what he did, or what was done unto him, during the space of several dayes before.

Sr Walter Rawleighs *Cordial*, *after* Sr R. K. *his way*:
(Set down Verbatim *as I received it.)*

TAke Burrage-Flowers, Rosemary-Flowers, Marigold-Flowers, Red July-Flowers, *Rosa-Solis*, Elder-flowers of each, one Pottle after they are dried in the Shade.

Take also of Scordium, Carduus, Angelica, Baulm, Mint, Marjoram, Setwall, Betony *ana* four handfulls, after they are dry'd in the Shade.

Take also of the Rinds of Sassafras of Virginia, *Lignum Aloës*, *ana*, four ounces beaten to Powder, of Kermes, Cubebs, Cardamoms, Zedoary, *ana*, one ounce, of Saffron half an ounce. Juniper Berries, Tormentil Roots, Round Birthwort Roots, of each one ounce, of Gentian Roots half an ounce.

Draw the Tincture or Extract of these with Spirit of Wine *in Balneo*, and save all the Ingredients after you have taken

aken out the Tinctures, and Burn them and put their Salt nto their Tinctures.

Take six ounces of the Extracts of all these with their Salt, and put thereto of the Tincture of Coral three ounces, *Terra Sigillata* four ounces, Pearl prepar'd two ounces, Bezar-stone three dragmes, Hartſ-horn calcin'd four ounces, Amber-greese four dragmes, Musk *gr.* xxx, Sugarcandy one pound and an half, ground very fine, and searsed through a fine Searse.

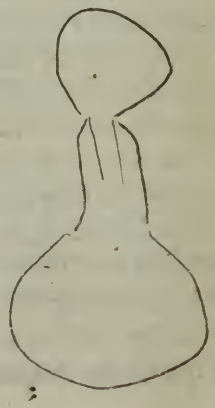
Then the Musk and Amber must be ground, and by little and little mingl'd with it, the more you grind the Amber, the better.

Then put to the Sugarcandy all the dry Materials before directed, and make all as small as possibly You can.

Then upon a great hallow grinding Stone mingle the Tinctures, and dry things together: (which must be done by a strong man used to that work:) and whil'st 'tis in grinding, put of Syrrup of Limmons, & Syrrup of Red-Roses equal parts into it, else it will be so dry, that twill neither grind nor mingle.

How to make the Tincture of Coral for this Cordial.

Take eight ounces of Coral, and put it unbeaten into a calcining Pot Unluted, and let it stand twenty four Hours in a calcining or Glass-furnace, 'till the Coral be as White as Snow; then put it in three quarts of distill'd Vinegar in a long Glass with a narrow mouth, and with another small Glass or Vial put into the Mouth of it, the Belly upwards, to save the Vinegar from wasting, *Thus* And set it in a Sand furnace, so as the Sand may be as high as the Vinegar.



Let

Let it boyl without intermiſſion twenty four Houres, by which time the Vinegar will become red; ſo, when 'tis cold, pour off the Vinegar into a Glaſs-Baſon, or a Bell-Glaſs, and vapor away all the Vinegar *in Balneo*, and gather the Coral, being perfectly dry, for your Uſe. You may ſtrike down Your Pearl with Oyl of Vitriol, and Oyl of *Sulphur* requal parts, which is accounted the beſt way to prepare the Pearl. But Sr *R.K.* did uſe to prepare his Pearl by juyce of Limmons.

[The Doſis for a Man is about the bigneſſe of a ſmall Haſil-nut, but where prevention onely is aim'd at, or ſome ſuch uſe as the diſſipating the Fumes of the Spleen, as they call it, the bigneſs of an ordinary Peaſe, may ſuffice; ſo in urgent Caſes the Doſe may be increas'd to the quantity of a Nutmeg. It is uſually given by it ſelf upon an empty Stomack (the Patient being kept Warm after it to promote Sweat) in Feavers, Want of Spirits, violent Fluxes, and ſeveral other diſtempers, where Diaphoreticks and Antidotes are proper, and (eſpecially) where potent Cordials are requir'd.]

[To the One Hundred Twenty third Page;

Where a Receipt that cur'd Fiſtula's is mention'd.]

A Water for a Fiſtula, *and all manner of VVounds, and ſwellings, or old Ulcers, Cankers, Tetters, Boils, or Scabbs in any place, or Green VVounds.*

TAke of Bole-Armoniack four ounces, of Camphire one ounce, of White Vitriol four ounces; Boyl the Camphire and the Vitriol together in a little Black Earthen Pot till they become thin, ſtirring them together till they become

become hard in ſetling; then Bruiſe them in a Mortar to Powder, and Beat the Bole-Armoniack it ſelf to Powder, and then mingle them together, and keep the Powder in a Bladder, till ſuch time You uſe it; then take a pottle of Running Water, and ſet it on the Fire till it begin to Seeth, then take it from the Fire, and put in three good Spoonfuls of the Powder into that Water whilſt it is hot, and after put the Water and Powder into a Glaſſe, and ſhake it twice a day to make the Water ſtrong: But before You uſe it, let it be well ſetled and very Clear, and apply it as hot as the Patient can well ſuffer it; and lay a clean Linnen Cloath, four double, to the Sore, it being wet in that Water, and bind it faſt with a Rowler to keep it warm, do it Morning and Evening till it be whole. This Water muſt be put into an Oyſter-ſhel, not in a Sawcer when you dreſs the Sore, for the Pewter will ſuck it up. Remember You put three as good Spoonfuls of the Powder as you can preſſe into the Spoon. Take heed no one Drink of this Water, for it is Poyſon. To make it ſtronger, beat an ounce of Alom to Powder, and mingle it with the other Powders.

Take of Bole-armoniack half an ounce, White Vitriol one ounce, of Camphire 2 ounces, make them all into Powder; then take a Pottle of Smiths-water, and as much Spring-water, and mingling them, ſet thew upon the Fire aſſoon as it begins to Seeth, put in the Powder very ſoftly, ſtirring it all the while, aſſoon as the Powder is in, take it off the Fire, and dreſſe the wound with it twice a day, laying a Cloath folded four times and wetted in the Water, it being very Hot, and ſo apply'd to the Wound.

NB. [This is the Receipt *Verbatim* as I find it among my old Papers, but I am not ſure that among thoſe I cannot now come by, there may not be ſomething concerning a way of

of making a ſmall pliable Tent that may accommodate it ſelf to the crooked Figure of the Cavity of many Fiſtula's. For methinks I remember, that the Chirurgion preſcrib'd the conveying his Medicine by the means of ſuch a flexible tent a great way into the cavity, if not to the bottom of the Fiſtula, which was thereby to be cleanſed.]

To the One Hundred fifty firſt Page.

Where Soot is mentioned.

SOot, *Pyrophilus*, is a Production of the Fire, whoſe Nature is almoſt as Singular, as is the manner of its being produc'd, for it is (if I may ſo call it) a kind of volatile Extract of the Wood it proceeds from, made inſtead of a *Menſtruum* by the Fire, which haſtily diſſipating the parts of the Body it acts on, hath time enough to ſever it into ſmaller Particles, but not leiſure and aptitude to reduce it into ſuch differing ſubſtances as paſs for Chymical or Peripatetick Elements, but haſtily carries up the more volatile parts, which being not yet ſufficiently free'd from the more fixt ones, take them up along with them in their ſudden flight, and ſo the Aqueous, Spirituous, Saline, Oleaginous and Terreſtrial parts aſcending confuſedly together, do faſten themſelves to the ſides of the Chimney in that looſe and irregular Form of Concretion, which we call Soot: An enquiry into whoſe Nature, as it may be conſider'd in the Survey of the diſtinctions of Salts, muſt be elſewhere look'd for; Our mentioning it at preſent, being only to take occaſion to tell You, that as ill ſcented and deſpis'd a Body as it is, *Hartman*, (one of the moſt experienc'd and happy of Chymical Writers) ſcruples not to reckon the Spirit and Oyle of it among

the Nobleſt *Confortantia*, ſuch as prepar'd Pearl, Coral, Ambergreeſe, and other eminent Cheriſhers of Nature, His preparation is for ſubſtance this; Take of the beſt Soot (ſuch as adheres to the lower part of the Chimney, and ſhines almoſt like Jet) what quantity you pleaſe, and with it fill up to the Neck a very well coated Glaſs Retort, or an Earthen one, and luting on a capacious Receiver diſtil the matter in an open fire intended by degrees, whereby you will drive over the Phlegm, the whitiſh Spirits, and the Oyl firſt of a Yellow Colour, and then of a Red, ſeparate the Phlegme, and for a while digeſt the Spirit and Oyle together, on which afterwards put half the quantity of Spirit of Wine, and Diſtil them ſeveral times, whereby you will obtain together with the Spirit of Wine, the Spirit of Soot, and alſo a very depurated Oyl, ſmelling like Camphire. Out of the Calcin'd *Caput mortuum* after the common way extract a Salt, which *Hartman* commends as a moſt excellent curer of exulcerated Cancers; This Salt, ſaith He, is drawn with Vinegar, in which Liquor in a Cold moiſt place, it is again Diſſolv'd, and therewith the Cancerous Ulcers being once or twice anointed, the venenoſity will be viſibly drawn out like a Vapour, and then the foremention'd Oyl being lightly ſprinkl'd upon the place will breed on it a kind of Cruſt like a skin, which Spontaneouſly coming off in five or ſix Days, will by its falling off, argue the Conſolidation of the Ulcer. What this ſo extoll'd Remedy will perform I know not, having never made trial of it, nor thinking it very likely, that a bare Alcalizate Salt ſhould have ſuch *Specifick Vertues*, nor is it requiſite I ſhould inſiſt on it, being here to diſcourſe to You of the diſtill'd Liquors of Soot, in proſecution of which deſign, let me tell You, that *Hartman* preſcribes the adminiſtring of the Spirit from ſix to ten Grains,

Hartm. prax. Chym. p. 12.

of

of the Oyl from two to three drops in Wine, or any other convenient Vehicle, and concerning the Oyl he adds, That if three Drops of it be given in Vinegar to an almoſt gaſping Man, he will be thereby wonderfully refeſh'd, and as it were reviv'd, to which he annexeth this Prognoſtick, that if the Remedy produceth Copious Sweats, it will recover the Taker; but if not, he will Die.

That this ſpirit of Soot deſcrib'd by *Hartman* may be a very good Medicine I am very apt to think; but becauſe 'tis not a meer ſpirit of Soot, but a mixt one of Spirit of Wine, and ſpirit of Soot, we have rather choſen to proceed with the Soot (of Wood) without addition, both as to the diſtillation of it, and the ordering of the Diſtill'd Liquors, after the manners to be mention'd ere long, when we ſhall acquaint You with our preparations of Blood and Harts-horn, which if You pleaſe to apply to Soot, You may ſave Your ſelf, and me, the labour of Repetitions. Yet it may be not amiſs to advertiſe You here of two things: the one, that if You employ very good and fat Soot, and fill up the Retort with it to the Neck; You muſt be very careful to encreaſe the Fire orderly, and but by moderate Degrees, or elſe you may chance to make the matter Boil over out of the Retort into the Receiver, as it lately happen'd to us, when having warily order'd the Fire for ſeveral Houres we thought our ſelves paſt any ſuch danger; And the other, that as to the Medicinal Vertues of the ſpirit, and ſalt of Soot, I ſhall not now particularize them, partly that I may ſave time, and partly becauſe they may be well enough gather'd from their affinity to the Volatile ſalts and ſpirits of animal ſubſtances hereafter to be treat'd of, and from what I ſhall have occaſion to ſay, of the perfuming of the ſalt of Soot towards the cloſe of this APPENDIX.

To the One Hundred Fifty third Page.

URIN is a Body, which, as homely and despis'd as 'tis wont to be, may by skilful wayes of ordering it, be made either alone, or in Conjunction with other Ingredients, to afford such a variety of useful Substances, that I find *Reusnerus* publish'd an Entire Treatise, which yet I never could get sight of, under the Title of *Synopsis Remediorum ex Urina præparatorum*, besides what other Chymists have since divulg'd on the same Subject, which I forbear to mention; because several of them I have not try'd, and many others I think scarce worth trying. But because even all our own Observations concerning the Preparations and uses of things afforded by Urine, would take up more time and Room, then I can now allow them, I shall here only take this occasion to intimate thus much in general, that the Spirit and Salt of Urin may be made far greater use of, then Men yet are prone to think not onely in Physick, but in Chymistry, and perhaps I durst add in Natural Philosophy too. And though *Helmont* be not wont to lavish his praises upon worthless Remedies, yet he calls it *Nobile ad Icterum, alioſq; morbos, Remedium.* And in another place, speaking of the Saline Christals of Urine, he hath this Expression: *Quæ quanquam ad Veteres Excrementorum Oppilationes conferunt, nihil tamen adversus Lithiasin*, which seems, by denying to the Salt of Urine some Vertues ascrib'd to it by many other Chymists, to bring some credit to his praises of it (And indeed a friend of mine, that has try'd it in the Jaundise, affirms it to deserve the Commendation he gives it in that Disease.) And though I fear our Author Hyperbolizeth, where He (elsewhere) thus writes: *Spernit eos sapientia*

De Lithiasi. c. 3. n. 3.

(he

(he means sure, that which is proper to the Spagyrists) *qui Materiam ex qua dispositiones, Contenta, Proprietates, Progressum & significationes Lotii addiscere recusarunt per ignem*; Yet perhaps the Hyperbole is not altogether so extravagant as most Readers will think it. And I remember, that a while ago, conferring with the Publick Minister of a Foreign Prince, who is a very inquisitive and experienc'd Person, He freely told me, that though he had Travelled very much, and divers times not in a private Capacity, yet the greatest Chymist that ever he could make acquaintance with, us'd to tell him, that Salt of Urine was so precious a thing, that 'twas pitty it should be us'd in ordinary Diseases; But what his Reasons were for valuing it so much, he would not declare, and therefore I shall lay no great weight upon his Testimony. And yet I must not at this time particularly declare, upon what account it is that I so value the volatile Salt of Urine, of whose Vertues (whilst 'tis single) I shall onely in a word observe to you now (what is pertinent to the occasion of my mentioning it at present,) namely, that when 'tis well prepar'd [*according to the way plainly enough, though but very briefly couch'd already* *] it differs so little in smell, taste, volatility, penetrancy and some other manifest Qualities, from the Salt of Harts-horn, and that of Mans Blood; that such effects, though perhaps somewhat less powerful may be not improbably expected from it as are produc'd by the other.

* p. 153.

To

To the One Hundred Fifty fourth Page.

Though I have not in this place made any absolute Promise, of annexing any thing, more particular touching the Spirit of Blood, and though I cannot now find, and I fear may have lost those of my Papers concerning that subject, which were the least unaccurate; Yet, setting aside former tryals, a recent Account brought me by a Physician, whom I had entrusted with some of it, represents it as so very good a Medicine, that I am content to subjoyn, what particulars I have lately found among my loose Papers concerning it, as I many years agoe sent them to a friend, and this I the rather do, because there being annexed to the Process divers Observations of general Import to such kind of Preparations, they will be better understood with it, then without it, and I have not now the leisure to new mould them. Thus then;

---TAke of the Blood of an healthy Young man as much as you please, and whilst it is yet warm, adde to it *twice its weight of good Spirit of Wine, and incorporating them well together, shut them carefully up in a convenient Glass Vessel, wherein the matter must be set to digest *in Balneo*, or Horse-dung, for six weeks, or more; then in a Glass head and body, placed in Ashes or Sand, draw off with a gentle Heat as much Liquor as will come over without necessitating you to impress any *Empyreuma* upon it, the remaining matter must be taken out and put into a strong and capacious Retort, which being placed in Sand, and accommodated with a large Receiver carefully luted to it, the matter therein lodged must be gradually pressed with a vehement Fire,

* *This, if I misremember not, was the Proportion I employ'd in the exactest of my Experiments of this kind, but it seems to be Essential to the goodnesse of the Remedy: the Spirit of Wine serving chiefly but to keep the Blood from corrupting.*

Fire, which must at length be encreased till it be strong enough to give the bottom of the Retort a red heat. There will first come over (after perhaps a little Phlegm) Spirit, either accompanied or closely followed by a copious volatile Salt, fastning it selfe to the sides and top of the Receiver; and much about the same time there will also come over an Oyl, or two, or more (for I have not observed the oleaginous part to come constantly and regularly after the same manner) the Receiver being taken off, all that it contains may be poured together into a convenient Vial, to be therein digested for a Moneth, if you please: or otherwise without that previous digestion, you may wash down the volatile Salt, adhering to the sides of the Receiver, with the Spirit and Oyl well shaken about it, and pour altogether into a large Glass Funnel well lined with Cap-paper, first moistned with the Spirit or fair Water, through which the Spirit and as much of the volatile Salt, as it and the Phlegm can dissolve, will pass first, leaving the Oyl behind them in the Paper, which must be seasonably set aside, or else the Oyl also, though more slowly, will pass through the Filtre: The Phlegm, Salt and Spirit, must be rectified with a very gentle heat, so often, till the Phlegm be perfectly separated, and they leave no *faeces*: The Oyl also may be rectified two or three times from its own *Caput Mortuum* calcin'd, or else from Salt of *Tartar* to deprive it of its muddiness. The Distempers wherein this *Arcanum* or Spirit of Man's Blood is proper, are divers, but cheifely Astmah's, Epilepsies, acute Feavers, Plurisies and Consumptions. But to comply with my present haste, I shall advertise You in the general, as to the use of this and the other Remedies to be subsequently mention'd, that for Them I must refer you to the particular Narratives, which I shall scarce, if You seasonably

ſonably deſire them, refuſe You: And in the mean time, because theſe volatile Remedies are near enough of kin to each other, I ſhall adde to this firſt Proceſs (which is at leaſt one of the nobleſt of them) ſome Obſervations of a more general nature, that they being applicable to divers other Preparations, we may both of us avoid the trouble of needleſs Repetitions.

Obſervations.

1. I ignore not that there are extant in *Burgravius*, *Beguinus*, and divers other Chymical Authors, very pompous and promiſing Proceſſes of the Eſſence of Mans Blood, to which they aſcribe ſuch ſtupendous Faculties as I ſhould not onely wonder to finde true, but admire that they can hope the Reader ſhould believe them ſo. But of theſe Preparations, ſome being, as that of *Burgravius* in his *Biolychnium*, very myſtical and unlikely; and others, like *Beguinus* his ℥. *E. Sanguinis humani*, exceedingly laborious and not ſo clear, I have never put my ſelf to the trouble of making them, but ſhall be very forward to acknowledge their excellency, if any Man ſhall vouchſafe me an Experimental Conviction of it. For though I think the preſent Preparation of Blood no bad one, yet I am far from daring to affirm there cannot be a better.

2. He that intends to have any conſiderable quantity of this Spirit and Salt, muſt provide himſelf of a large proportion of Blood, or elſe he is like to fall far ſhort of his expectation; becauſe as full of Spirits as Blood is ſuppoſed to be, it yields commonly (at leaſt the beſt I have hitherto met with) no leſs then two thirds, or more, of Phlegm, beſides a not deſpicable quantity of terreſtrial and unſerviceable Matter.

3. It

3. It is requisite, both that the Retort wherein the dryed Blood is distilled be pretty large and strong, and that the Fire be very carefully and gradually administred, least either the copious Fumes break the too narrow Vessels, or the Matter too hastily urged boil over into the neck of the Retort or the Receiver; both which dangers this Advertisement may help you to avoid at a cheaper rate, then I, who have not been forewarn'd of them but by unwelcome Experience.

4. There is a Friend of mine, an excellent Chymist, whose rare Cures first gave me a value for Remedies made of Blood, who useth (as himself assureth me) to mingle with the Spirit that other Liquor, drawn over at first in a Head and Body, and twice or thrice rectified by it self. But that Liquor consisting almost totally of the Spirit of Wine, and the not over-grateful Phlegm of the Blood, though there may perhaps be passed into it some of the more fugitive Particles of the volatile Salt: Yet they being so few as are scarce discernable, this Liquor seems fitter to be made a Vehicle, then an associate of our Spirit, and perhaps too is not in all cases the most proper Vehicle in which it may be administred: (though if it were not for the Spirit of Wine, I should somewhat suspect that the Phlegm, though so destitute of the more active Ingredients, as to be fit to be kept separated from them, may not it self be quite devoid of specifick Vertues.) But my esteem of the Artist I have mentioned, doth make me think it fit to acquaint You with his Practise, notwithstanding that hitherto his authority be the chief thing that recommends it to me.

5. Divers ways may be propos'd of purifying this Spirit and Salt we are discoursing of, but having try'd several, that which I now use is this that follows: I put the Salt, Phlegm,

and Spirit together, in one of the higheſt and ſlendereſt Bodies I can get, that the Phlegm might not be able to aſcend eaſily into the Head, and that the volatile Salt may be the better ſeparated: Then in a very gentle heat (I moſt uſe that of a Lamp Furnace) there will aſcend a pure white and volatile Salt, adhering to the cheeks and noſe of the Glaſs-head, which if I deſire by it ſelf, I ſweep it away before the Spirit begins to riſe; but moſt commonly I ſuffer the Diſtillation to proceed, and the aſcending Spirit to carry down part of the volatile Salt into the Receiver, and ſo I continue the ſame degree of heat, till there ariſe ſo weak a Spirit that it plainly begins to diſſolve the volatile Salt: Then ſhifting the Receiver, I reſerve the ſtrong Spirit and volatile Salt by themſelves, and take the ſucceeding weaker ſpirit by it ſelf alſo; to which, if I pleaſe to fortifie it, I adde as much of the volatile ſalt, formerly reſerved, as it is able to diſſolve. In the bottom of the Cucurbit or Vial, there will remain a phlegmatick kinde of Liquor, which uſually contains ſome of the ſalt or ſpirit, and ſometimes too (which is ſomewhat odde) ſome of the oleaginous part of the Blood, which did not before appear to have been aſſociated with the ſpirit, and to have paſſed through the Filtre with it. This nauſeous Liquor may be kept by it ſelf till you have a ſufficient quantity of it, to be worth the trouble of ſevering from it the nobler parts: The ſpirit and ſalt above-mentioned may be again rectifyed, *per ſe*, with the like gentle heat as before, ſo often, till they leave behinde them no *fæces* nor Phlegm at all. But this is requiſite to be done onely when to maſter ſome ſtubborn Diſeaſe, the Medicine is to be exalted either to its ſupreme, or at leaſt to ſome approaching degree of Purity and Efficacy, for otherwiſe ſo exquiſite a Depuration is not always neceſſary.

6. As

6. As for the Oleaginous part which the Fire forceth out of Blood, my Obſervations of it hitherto have ſo little agreed, that, I dare as yet ſpeak but hæſitantly concerning it. For ſometimes but one Oyl hath been drawn over, ſometimes two: And I remember, laſt Year, a parcel of Blood, that was kept in a Dung-hill for many Moneths, yielded us a blackiſh and muddy Oyl, a purely red one, and another of pale Amber colour, which would not mingle with the darker; of each of which ſorts I yet reſerve ſome by me. This difference may poſſibly proceed partly from the previous preparation, or unpreparedneſs of the Blood, and partly from the various adminiſtration of the Fire employed to diſtil it. But for the moſt part we find theſe Animal Subſtances (if the degrees of Fire be orderly adminiſtred, and the heat ſufficiently intended towards the cloſe of the Diſtillation) to yield a double Oyl: the one more light and pure, which ſwims upon the Spirit; the other more muddy, aduſt and ponderous, which ſinks to the bottom of it. The uſe of theſe Oyls hath, by reaſon of their Fetidneſs, been by moſt Authors abſolutely rejected; and even thoſe few that do not altogether reject them, forbid their inward uſe, and allow them to be but externally employed: But conſidering, *Pyrophilus*, how much of the efficacy both of Plants and Animals is obſerved to reſide in their oleaginous part, it ſeem'd not improbable to me, that theſe Oyls might deſerve a better uſage, then either to be wholly thrown away, or confin'd to outward ſervices; and therefore having not long ſince given a Friend of mine ſome pure yellow Oyl of Man's Blood, diſſolved in Spirit of Wine, to try upon a Patient of his, ſick of a Hectick Feaver (in which Diſeaſe I had ſeen the Spirit of Blood very ſucceſsful) within a few days he brought me word of the unexpected recovery of his Patient, to whom he ad-

miniſtred our Medicine (that I may not conceal from you that Circumſtance) in *Balſamus Samech*, made with ſpirit of Vinegar inſtead of ſpirit of Wine; the remaining part of this yellow mingled Oyl I keep yet by me, to make further tryals with it. And that ſuch Oyls may not be loſt, I have been attempting (for I am yet upon my tryals) ſeveral ways to make them ſerviceable. Some of them that are of a more pure and defecated nature, I have (which is not unworthy your noting) found capable of readily uniting with Spirit of Wine, with which they may be allayed at pleaſure: In others I have ſeparated the finer and more volatile part, by drawing them over with a very gentle heat in a Retort half full of Water, which will carry over the lighter part of the Oyl with it into the Receiver, wherein the Oyl will ſwim upon it, and may be afterwards ſever'd from it by a Separating Glaſs, or any other convenient way (but I fear that this method, though it finely clarifie Oyls, may rob them of the beſt part of the Efficacy they may perchance derive from the latent admixtion of ſomewhat of the volatile Salt:) at the bottom of the Retort there will remain a dark and thick ſubſtance, whoſe nature I have not yet had opportunity to enquire into. Out of ſome Oyls (drawn from unprepared Materials) which would not diſſolve in ſpirit of Wine, I have, by digeſtion with ſpirit of Wine, drawn much of the ſcent and taſte; the ſpirit probably imbibing ſome of the finer parts of the Oyl, or elſe aſſociating to it ſelf ſome volatile ſalt that yet lay lurking in it: For ſometimes I have obſerved Oyls, after long keeping, to let fall a volatile ſalt undiſcerned in them before. Having alſo ſometimes mingled the heavier and lighter Oyls of the ſame Body with dephlegmated ſpirit of Wine, and in a low Retort drawn over what will riſe in a very gentle heat (inferiour to that of a *Balneum*) I have

have found the Spirit of Wine to carry over with it so many of the more subtle and active parts of the Oyl, that it was more richly impregnated therewith, then you will be apt to expect. But of what use this oleaginous Spirit may be in Physick, I have not yet had time to consult Experience, which I hope will, ere long, teach me better ways of improving the rejected Oyls we have been speaking of, then are those almost obvious ones hitherto mentioned, wherein I am very far from acquiescing; especially, since I cannot but suspect that such active Parts of such Concretes, would be found very capable of a great Improvement, if we were as skilful to give it them.

7. The Terrestrial Substance that remains after the Liquors are drawn of, if the Blood have been duely prepared, affords but so inconsiderable a quantity of fix'd Salt, that unless the *Caput mortuum* be exceeding copious, the *Alkali* will hardly be worth extracting: Besides that, if it could be obtain'd in a not despicable quantity, I should, what ever is pretended, very much doubt whether it would be endowed with very extraordinary Vertues, the violence of the Fire usually depriving fix'd Salts of the specifick Qualities of their Concretes: and even in the first Salt of Serpents themselves, I have not discerned other, Then the wonted Properties of *Alkalizate* Salts.

8. Because you may sometimes not have the leisure to wait six Weeks for the Preparation of Blood; and because oftentimes the occasion of using the Medicines we have been describing, may be so hasty and urgent, that unless some speedy course to relieve them be taken before the Physick can be prepared, the Patients will be dead. I think it not amiss, *Pyrophilus*, to advertise You, That though without any previous Preparation of Blood you should immediately

distil

distil it, provided an orderly gradation of heat be carefully observed, it will yield you a reddish Spirit, and (besides an Oyl or two) a volatile Salt; which being rectified, are so little inferiour, in any Properties discernable by the smell or taste, to the Salt and Spirit of predigested Blood, that 'tis very probable their Efficacy will emulate, though not altogether equal that of the more laboriously prepared.

9. And because it is difficult to get the Blood of healthy Men, and perhaps not so safe to use that of unsound Persons; and because many have a strong Aversion, and some an Insuperable, though groundless abhorrency, from Medicines made of Mans Blood, I have thought it not amiss to try whether that of some other Animals prepared the same way, might not afford us as hopeful Medicines: And because the Blood of Deer is chiefly (and perhaps not causlely) commended by Authors, we have handled it according to the foregoing Process, and thereby obtained of it a Spirit, and Salt, and Oyl, whose penetrancy, and other resemblances, makes us hope that they may prove good *Succedanea*, in the defect of those Analogous Remedies (drawn from humane Materials) which we have been treating of.

And to this let me, *Pyrophilus*, on this occasion, annex this Advertisement, That though in these Papers, and what I have further written of Preparations of this nature; I name not any great number of Concretes, as having drawn their volatile Salts and Spirits, yet I have endeavored in these Discourses to give You in the Instances I insist on, so much variety of Examples, that either by the Processes therein set down, or by Analogy to them, You may, I suppose, be directed with the help of a few tryals, to obtain the volatile Salts and Spirits of most Concretes that belong to the Animal Kingdom, and that are capable of affording any. For

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by the method we prescribe, a little vary according to the exigencies of particular Bodies to be distill'd, we have drawn the Spirits, Salts and Oyls of Sheeps-blood, Eels, Vipers, *&c.* the latter of which yield a Salt and Liquor, which in *Italy*, by divers Learned Men, is superlatively extoll'd against Obstructions, foulness of the Blood, and I know not how many Diseases proceeding from these two general Causes. And though I dare not deny that divers of those Praises may be well enough deserv'd, by the Remedies to which they are ascribed, yet I am not apt to think them much superior to the generality of volatile Salts: And even the Spirit and Salt of Sheeps-blood it self, did, by their penetrancy of taste and fugitiveness in gentle heats, promise little else Efficacy then those others so much celebrated Medicines.

10. Nor is it onely by being administred it self, that one of this sulphureous and subtle kinde of Spirits may become a good Remedy, but also by its being made a *Menstruum* to prepare other Bodies: For it will extract Tinctures out of several sulphureous and resinous Concretes, whose finer parts, by being associated with so piercing a *Vehicle*, may probably gain a more intimate admission into the Body, and have their Vertues conveyed further then otherwise they would reach. And a Learned Doctor, to whom I recommended such kinde of Remedies, confessed to me, That by the bare extractions of appropriated Vegetables themselves, with Spirit of Urine, he perform'd no small matter. But one difficulty You may meet with in drawing the Tincture of Minerals, and other very compact Bodies, even with good Spirit of Urine. (for that I account to be the cheapest of these volatile *Menstruum*, and the most easie to be obtain'd in good quantities) For we have found, but with a little heat,

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the more fugitive Particles to aſcend to the upper parts of the Glaſs, and there faſten themſelves in the form of a Salt; by whoſe receſs, the debilitated Liquor was diſabled from drawing the Tincture ſo powerfully as was expected, wherefore we were reduc'd to make our Extractions in ſhort neck'd Glaſs-Eggs or Vials exquiſitely ſtop'd (which may alſo be plac'd ſtooping in the Sand) and when we perceiv'd much to be lodg'd in the necks of the Veſſels, by barely inverting them, the hot Liquor ſoon reimbib'd the Salt, and was fit to be plac'd again in Sand; ſo that notwithſtanding this difficulty, we were able by this means, in no long time, to impregnate the Spirit of Urine, or of Harts horn (for I do not perfectly remember which it was) with the Tincture of Flowers of *Sulphur*, which may probably prove a noble Medicine in divers affections of the Lungs, ſince in them theſe volatile Liquors alone have been found very effectual. And I remember, I have ſometimes made a much ſhorter and more odde Preparation (which at any time You may command) of Crude *Sulphur*, whereby in not many hours I have, by the means of Salts, brought over ſuch a ſulphureous Liquor or Tincture, as even in the Receiver was of a red Colour, as well as of a ſtrongly ſulphureous Scent.

[*To the Page* 164, 165, *&c. where* Ens Veneris *is treated of.*]

BUt before I enter upon Particulars, I think it will not be amiſs to tell You how this Preparation firſt occur'd to Us, becauſe by that Information, Your happyer *Genius* may peradventure hereafter be prompted to improve this Remedy, or to deviſe one more approaching to the Nature and Excellency of that which we endeavor'd, but with very imperfect

perfect ſucceſs to light on, or equal, by our *Ens Veneris*. I muſt then tell You, that an Induſtrious Chymiſt (of our Acquaintance) and I, chancing to Read one day together that odde Treatiſe of *Helmont*, which he calls *Butler*, when we had attentively perus'd what he delivers of the Nature as well as ſcarce credible Vertues of the *Lapis Butleri* he there mentions, we fell into very ſerious Thoughts, what might be the matter of ſo admirable a Medicine, and the hopefulleſt manner of preparing that matter. And having freely propos'd to one another our Conjectures, and examin'd them by what is deliver'd by *Helmont*, concerning the Preparation of *Butlers* Stone, or ſome emulous Remedy we at length concurr'd in concluding that either the *Lapis Butleri* (as our Author calls it) or at leaſt ſome Medicine of an approaching Efficacy might, (if *Helmont* did not miſ-inform us) be prepar'd by deſtroying (as far as we could by calcination) the body of Copper, and then ſubliming it with *Sal Armoniack*.

And becauſe the Body of *Venus* ſeems leſſe lock'd up in good Vitriol, then in its metalline form, we concluded that it was beſt to calcine rather the Vitriol, then the Copper it ſelf, and, having freed the *Colcothar* from its ſeparable Salts, ſo to force it up with *Sal Armoniack*. But the Perſon I diſcours'd with, ſeeming ſomewhat diffident of this Proceſs by his unwillingneſs to attempt it, I deſir'd and eaſily perſwaded him at leaſt to put himſelf to the trouble of trying it with the requiſites to the work which I undertook to provide, being at that time unable to proſecute it my ſelf for want of a fit furnace in the Place where I then chanc'd to lodge. And though at firſt we did not hit upon the beſt and moſt compendious way, yet during the Sublimation, he being ſuddenly ſurpris'd, as both himſelf and his Domeſticks two daies after told me, with a fit of ſickneſs, attended with very horrid and

 ſeemingly

seemingly Pestilential Symptomes, was reduc'd to take some of this Medicine out of the Vessels before the due time, and upon the use of it found as he told me an almost immediate Cessation of those dreadfull symptoms, but not of the Paleness they had produc'd. This first prosperous Experiment, emboldned us to give our Remedy the Title of *Primum ens Veneris*, which, for brevities sake, is wont to be call'd *Ens Veneris*, though I am far from thinking, that it is the admirable Medicine to which *Helmont* gives that name, at least if his *Ens Veneris* did really deserve half the praises by him ascrib'd to it. But such as Ours is, I shall now (as time and my yet incompleat Trials will permit) acquaint you with that Process of it, which (among some others) we are most wont to employ, as the most easie, simple, and genuine.

Take then of the best *Hungarian*, or if you cannot procure that of the best Dantzick, or other good Venereal Vitriol, what quantity you please, Calcine it in a strong fire, till it be of a dark Red, Dulcifie it by such frequent affusions of hot Water, that at length the Water that hath pass'd through it, appear full as tastless, as when it was pour'd on it. Let this thus exquisitely dulcified *Colcothar*, when it is thorowly dry, be very diligently ground with about an equal weight of good *Sal Armoniack*, and let this mixture be put into a Glass Retort, and either in as strong a heat as can conveniently be given in Sand, or els in a naked fire, force up as much of it as you can to the Top or Neck of the Retort, and this Sublimation being ended, out of the broken Retort (laying the *Caput Mortuum* aside) take all the Sublimate, and grind it well again, that if in any part the *Sal Armoniack* appear sublim'd by it self, it may be reincorporated with the *Colcothar*, Resublime this Mixture *per se* in a Glass Retort as before, and if you please you may once more elevate this second Sublimate,

Sublimate, but we have not found That allwayes needful. And for the better understanding of this Process, be pleas'd to take notice of the following Particulars.

First, We have alwaies preferr'd such Vitriol as abounds with Copper, before our common English Vitriol, about the making of which, those that keep the Copperas work at *Detford* are wont, as themselves have upon the place inform'd me, to use good store of Iron to increase the quantity of their Vitriol.

Secondly, If You be unwilling to loose the Phlegm, Spirit and Oyl of that Vitriol with which You design to make *Ens Veneris*, You may distill them away in an earthen Retort, or one of Glass well coated. But though it be well known that the distillation of Oyl of Vitriol requires a very intense and lasting Fire (so that unless you have need of the Liquors, the best way will be without any Ceremony to calcine the Vitriol in a naked Fire and open; yet afterwards it will be for the most part requisite further to calcine the *Caput Mortuum* in an open Vessel. For you must take notice, that unless the Vitriol be very throughly calcin'd, it will be very troublesome for you to dulcifie it, and sometimes we have observ'd that the *Caput Mortuum* which look'd Red, and seem'd indifferently well calcin'd, hath been, almost like Crude Vitriol dissolv'd in the fair Water which was pour'd on it to dulcifie it. The weight of the *Calx* in reference to the Vitriol, of which it was made, we cannot easily determine, but we have sometimes found it necessary to reduce the Vitriol to less, perhaps much less then half its weight to make it fit for Dulcification.

Thirdly, The Water that hath been pour'd on the first and second time to edulcorate, the calcin'd Vitriol, may be filtrated and steamed away, till it come almost to the consistence

ſiſtence of a Syrrup or Honey, and then may be put into a cold place to ſhoot; for after this manner we have ſometimes had many very regularly figur'd Chryſtals or Graines of Salt, I ſay ſometimes, becauſe ſometimes alſo you may find it neceſſary to abſtract all the Water, to obtain the Whitiſh Salt of Vitriol, which we have known us'd as a good Vomit, and which *Angelus Sala* none of the leaſt ſober of the Chymical Writers doth highly extoll as an excellent Emetick in his *Ternary of Vomitive Remedies*, where he diſcourſeth at large of the Vertues of it, and the way of adminiſtring it. And of this Salt, as Chymiſts are pleas'd to call it, we have had out of calcin'd *Copperas* a very great quantity, and have ſometimes obſerv'd it to have been almoſt as deeply colour'd as the Vitriol it ſelf was before Calcination.

Fourthly, We ſeveral times tryed to ſublime dulcified *Colcothar* with *Sal Armoniack*, in Retorts and Urinals plac'd in Sand, but whether by reaſon of the fixedneſs of the *Colcothar*, or becauſe the Furnace we were fain to uſe, though no very bad one, was none of the beſt, we never could that way obtain any conſiderable Quantity of the deſir'd Sublimate, and that which did aſcend was but of a faint colour: wherefore, unleſſe you have an extraordinary good Sand Furnace, if you will make uſe of Glaſſe Veſſels, which is the cleanlieſt way, You will find it expedient to ſublime Your *Colcothar* in coated Retorts with an open Fire, except you have the Dexteritie to ſublime in a naked Fire with Glaſs, Retorts uncoated, which we have divers times ſeen perform'd by heating the bottome of the Retort by degrees, and then placing it upon Embers, with Coales round about it, but to be kindled at a diſtance from it; for if this courſe be watchfully follow'd, the Retort will be ſo well neal'd, before it be reduc'd to endure any intenſe degree of heat, that after a while

while You may safely lay thorowly kindled Coales, not onely round about it, but upon the top of it, (which needs not to be done, till towards the end of the Operation) and thereby drive most of the Sublimate into one lump, and into the Neck of the Retort. And by this way you may sublime without any Furnace upon a bare Hearth, but if you desire to give a more intense heat, you may lay first some warm ashes in an ordinary Iron pot, and having with them, and a few small Coals well kindl'd, neal'd your Retort, you may afterwards prosecute the Sublimation in the same Pot, which being once throughly heated it self by the Fire, will afterwards considerably increase the heat of it.

Fifthly, Though it be most commonly requisite to resublime the Sublimate, that comes the first time up, that the Salt and *Colcothar* may be more exquisitly mix'd, yet as far as we can guesse by some trials, it will not be expedient to resublime it above once (or at most) twice. For in those Trials we have found the *Ens Veneris* oftener resublim'd of a paler colour, then that which was resublimed but once. And (*NB.*) perhaps, by further sublimations, the Salt instead of being more intimately united with the *Colcothar*, may be almost totally sever'd from it, according to what we elswhere in other cases declare.

Sixthly, Of these Sublimates, that which hath the highest Colour, seems to be the best, as being most enrich'd with the *Colcothar*, from whence the redness proceeds. But at the first Sublimation I have often observ'd a pretty part of the *Sal Armoniack* to come up first white by it self, especially if it had not been very diligently mix'd with the *Colcothar*. But at the second sublimation the Ingredients (which we have sometimes almost totally forc'd up without leaving a *Caput Mortuum* in the bottom of the Retort) will be more accuratly

accuratly mix'd, and the Sublimate will appear Yellow, and perhaps Reddish, of which sort we have sometimes had, when the Operation hath been very carefully manag'd.

Seventhly, How great a proportion of the Ingredients committed to Sublimation, will arise in the form of *Ens Veneris*, we dare not precisely define, but a Sublimate amounting to the fourth part of the whole Mixture, you will scarce, if you work skilfully, faile off.

Eighthly, We sometimes made a Sublimate of equal parts of pure *Sal Armoniack* and Salt of Tartar, both of them very throughly dry'd (for else they will be apt to yeeld rather a Spirit then a Sublimate,) well ground together, and so sublim'd; And with this Sublimate instead of Simple *Sal Armoniack* we intended to make *Ens Veneris*, but by some intervening Accidents and Avocations we were not able to perfect the Experiment, of which we nevertheless think it fit to give You this hint, because of the great Efficacy, which an excellent Physitian of my acquaintance, to whom I gave some of it, assures me he has found in it against Obstructions and some Distempers that are wont to spring from them.

Ninthly, When you are about to make Your first Sublimate, You may if You please, lute to the Retort, whereinto You put the Ingredients, a small Receiver to catch the Liquor that oftentimes comes over. For that Liquor, though you will very seldome get much of it, yet may be worth your preserving, by reason of the Volatile and Urinous Salt wherewith it will sometimes so abound, that it may passe for a weak Spirit of *Sal Armoniack*.

Tenthly, The *Caput Mortuum* that remains after the first Sublimation, may be put into a clean Glass, and set in a Cellar, where it will run *Per deliquium*, into a thick and high colour'd

colour'd Liquor, very richly impregnated (as we elsewhere manifest on another Occasion) with the somewhat opened body of *Copper*, from whence if half those praises be true, which even the best Chymists are pleas'd to give to *Copper*, it may be very well concluded to have deriv'd no small Vertues against Ulcers, and divers other Affections, which we are not here to insist on.

Eleventhly, We have sometimes doubted whether or no our *Ens Veneris* did really contain any thing of *Cypreous* or *Colcotharine* in it, partly, because of the fixedness or sluggishnesse of *Colcothar*, and of the *Copper* therein contain'd; and partly because, that if *Sal Armoniack* be two or three times sublim'd by its self, its Flowers frequently enough will ascend Yellow, like the paler sort of *Ens Veneris*. But first, that *Sal Armoniack* is capable of carrying up even fix'd and sluggish Bodies seem'd probable to us, partly upon our incorporating and subliming it with finely powder'd Coralls (from which, though but very little of it ascended, yet some of that little was no lesse red, then the Coralls themselves before their being beaten) and partly upon our subliming it from *Copper*, both Crude and Calcin'd, since of either of those Bodies it carry'd up a little with it, as appear'd by the Blew Colour of some parts of the Sublimates.

And secondly, that the reddishnesse of our *Ens Veneris* proceeded partly, if not altogether from the *Colcothar*, seem'd probable to us, not onely by the taste, and some other Properties of it, but also by this, that having knowingly committed the first sublimate to a Fire too weak to resublime it; and having after some Hours, taken the Vessel out of the Sand, we found that the Fire, which we suppos'd was not strong enough to carry up the whole Matter, had rais'd the *Sal Armoniack* to the upper part of the Urinal in Flowers,

that

that were either White, or but of a pale Yellow; whereas the remaining part of the Mixture, that lay in good quantity in the bottome of the Veſſel, was of a deep Red, and a fragment of it of about the bigneſs of a large Peaſe, being caſt upon glowing Coales, and nimbly blown with a pair of Bellowes, colour'd the Flame with a ſomewhat greeniſh blew like that, but more faint, which we elſwhere have obſerv'd to proceed from the well opened body of Copper.

But thoſe Trials I confeſs would rather increaſe my Doubts then leſſen them, becauſe in our *Ens Veneris* the Colour is not Blew, but Reddiſh, if I did not conſider, that *Colcothar* is a body that conſiſts of ſome other matter beſides common Copper (as it is alſo far more difficult to reduce, though but in part, into a mettal then is vulgar calcin'd Copper) and conſequently when Corpuſcles of differing Natures are by the *Sal Armoniack* elevated together, that which is not Metalline, may with the aſſiſtance of the Fires Operation alter the Nature of what is, and thereby produce a Colour differing from Blew. But to diſpatch what ever further Trials ſhall inform us, touching this Queſtion, whether or no any true and reducible Copper do make an Ingredient in our *Ens Veneris*, yet there being in *Colcothar* other parts as well as thoſe, that by Fuſion you may reduce into a pure Mettal, and our Remedy ſeeming by its Somniferous property to partake of them, it will not be neceſſary to the giving our Medicine a Right to the Appellation I commonly chooſe of *Flores Colcotharis*, that in it there is ſomething of the *Colcothar* carry'd up, though poſſibly the quantity be but ſmall, and not all reducible into a Metalline form, but perhaps the Queſtion is not worth a longer Debate, it being ſufficient to excuſe the name, and recommend the thing to ſuch a Perſon as You, that *Colcothar* is employ'd

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in the making of it, and that the thing prepar'd is a noble Medicine, and hath some of the great Vertues ascrib'd to Vitriol; whether that Mineral be an ingredient of it or no.

The Dosis of *Ens Veneris* may be very much vary'd; To little Children, we give sometimes one, sometimes two, and sometimes three Grains for many nights together, as we find them able, without inconvenience, to bear the Operation. To persons of ripe Years we commonly administer four, five, or six Grains at a time. But one, to whom we have given quantities of it to ly by him, tells us, That he hath taken to above thirty Grains at once without any inconvenience. We are wont to give it in two or three Spoonfuls of Sack, or other Wine, if the Constitution of the Patient, or the Nature of the Disease do not forbid it, and in such cases we give it in any Cordial Liquor, that is temperate, or any other convenient Vehicle.

To Children it may be given in Beer, or Ale, or clear Posset-drink, but not in Milk. If the Patient hath supp'd at a seasonable Hour, we commonly administer it, when he is going to sleep. It works for the most part by sweat and a little by Urine, but more by sweat at the beginning, then after the body is us'd to it, yet to some bodies it proves so Sudorifick, that two Grains or lesse of it, have often made me sweat. That it hath once prov'd Emetick I have heard, but never observ'd it my self to provoke Vomits.

As for the Medicall use of *Ens Veneris*, divers great Physitians will perhaps think it were not despicable, though it were no other then oftentimes to prove a safe and moderatly somniferous Medicine in Feavers, without having any thing in it of *Opium*, whose Narcotick power they find as difficult to correct, as it oftentimes proves dangerous, when being not well corrected, it is administred without very great Circumspection. But- **********

To the 166[h], 167th, 168th, 169th, and 170th Page.

[*Finding among my looſe Notes, together with thoſe that doe immediatly concerne the Preparations of Sulphur and Hartshorn (deliver'd in theſe Pages) ſome other Particulars that may alſo ſerve, either to afford ſome light to Readers leſſe skill'd in Chymiſtry, or contribute ſomewhat or other towards the relief of ſome Patients, I am content to let thoſe Papers goe together, as I long ſince addreſs'd them to a Friend.*]

HArts-horn, *Pyrophilus*, is a Heteroclite Body in Nature, which hath but few reſemblers in the univerſe, for it grow's to a conſiderable bulk like a Vegetable, and is (unlike moſt other Hornes of Animals) at certain ſet Periods of time, deciduous, and though it be of a Bony ſubſtance, yet that middle part of it which differs from the reſt in Colour, does (at leaſt in grown Hornes) much more reſemble the pith of ſome Plants then the Marrow of Bones: and yet this Plant-Animal (if I may ſo call it) does, when skilfully expos'd to the Fire, afford the ſame differing ſubſtances, with the Blood, Fleſh, and other parts of Animals. 'Tis no wonder therefore, if Phyſitians and Chymiſts have hoped to find extraordinary Vertues in ſo extraordinary a Subject, of which we ſhall paſſe by the Uſual Preparations as not ſo pertinent to our preſent deſign, inſinuating only in the generall, That though even the more Vulgar Preparations, as well as that which Phyſitians have been pleaſed to call Philoſophical, afford us Medcines not deſpicable; yet theſe are much inferiour to thoſe Remedies wherewith dexterous Diſtillations are capable of preſenting us; and certainly if we allow of the Chymical Theory, (whoſe Truth in theſe Papers I queſtion

queſtion not) Harts-horn being generally acknowledged to be endued with properties very friendly to our Nature, and even thoſe wayes of preparing it wherein the nobler and more active parts are not truly freed from thoſe cumberſome ones that fetter them, and hinder them to diſplay their powerful energies, proving yet oftentimes not unavailable; The Spirit and Salt of Harts-horn would be in more requeſt, were not Men deterred from making tryals of it, partly by the over-apprehended unpleaſantneſs of the ſmell, and partly by the difficulties commonly met with in its diſtillation; the latter of which Deterrements hath ſo frighted even Chymiſts from diſtilling this Cordial Subſtance, that we have very rarely ſeen any, either Spirit or Salt of Harts-horn, ſave what our ſelves have been reduced to prepare.

There are three ways propoſed by the Authors I have met with, to diſtil Harts-horn: The one in coated Glaſs Retorts; the other in Earthen ones; and the third in *Glaubers* ſecond Philoſophical Furnace.

In the firſt of theſe ways, ſome very skilful Diſtillers that have often practiſed it, have ſo complained of their frequent breaking their Veſſels by the copiouſneſs and impetuoſity of of the Fumes that ruſh out of the Matter, when it once begins to be preſt with a conſiderable heat, that I confeſs to You ingeniouſly, *Pyrophilus*, they have hitherto frighted me from making tryal of that way, though I ſee no very great reaſon why, by a ſlow and regular gradation of the Fire, the miſchances incident to this way of diſtillation may not (at leaſt moſt commonly) be avoided.

To diſtil the Matter we diſcourſe of in Earthen Retorts, is a ſafer way then the former, if the Earth be cloſe and good, and have been ſufficiently bak'd; as we finde in the right *Haſsian* Retorts, wherein we have known the Operation

proceed very prosperously, though a considerable quantity of the Matter hath been distill'd at once; but the Retorts made of Earth that is spongy or any other ways unfit, or in whose baking Fuel hath been spared, are commonly (as Experience hath informed us) improper for this service, wherein they are easily broken: Besides that, it is much to be feared that all Retorts made of Earth, except it be extraordinarily compact and baked, are apt to imbibe the more subtle and more penetrant parts of Harts-horn, and other volatile Substances distill'd in them; which we have observed in some, wherein the Matter hath transudated quite through the substance of the Retort, and been manifestly discernable on the out-side of it.

The third way of distilling Harts-horn, is performed by the Instrument described by *Glauber*, in his second Philosophical Furnace: But neither is this way without its Inconveniencies; for besides that, if the Earth whereof the Vessel to be employed is made, be not of very good and well baked Earth, it will be apt to crack, in so violent a Fire as is requisite in this way of Distillation, or else it will imbibe part of the finest Spirit it should transmit into the Receiver: And besides that, it is difficult to work long this way, without letting some of the active part of the Spirit escape between the wide Orifice of the Retort and the Cover: Besides these Inconveniencies, I say, it is to be feared that the Matter being to be cast immediately into the Vessel, made red hot before-hand, it will receive a stronger *Empyreuma* or Impression of the Fire, then it would do in the ordinary way of Distillation, wherein the Fire being orderly and successively increas'd, much of the Spirit and Salt comes over into the Receiver, before that last degree of Fire is administred; which is requisite chiefly to force over the more sluggish and heavy Oyl, which therefore (to speak con-

congruously to the most receiv'd Theory of Distillation) savors much more of the Fire, and is grown almost infamous for its adustion.

But notwithstanding these Inconveniencies, *Pyrophilus*, we have found these Retorts of *Glauber*'s not unserviceable, when we have had occasion to Distil considerable Quantities of such Materials, as were not so pretious, as to make the loss of a part of what they were to afford us considerable.

And this Advertisement may take place, especially if you take along with you, what we have declar'd, touching the Ways we substitute to avoid as much as may be, the newly objected Inconveniencies. But having in other Papers taken notice particularly enough of the Ways we mean, I shall forbear to mention them in this place, though one of them may easily be made applicable, as Experience hath assur'd us, even to ordinary Retorts; for 'tis not difficult to apply to *These*, the perforated Receivers, which being almost of the shape of Pears, open at both ends, by holes of about two or three Inches Diameter (according to the capacity of the Vessel) may be with great facility taken asunder and made clean; and may, by the convenient Insertion of their Extremities into one another, be easily luted together (in a level) two, three, or as many of them, as necessity shall require; and then provided there be applyed to the remoter extremity of the last of them, some convenient Vessel open but at one end, the Receivers will very seldom break: The Fumes that come over too copiously to be contain'd in one of them, passing freely thence into the second or the third (for we very rarely exceed three in all) which will be manifestly cool, and so, speedily turn into Liquor, the Fumes it receives, whil'st the first Recipient is perhaps hotter then the Hand can endure: But of these Mechanical Contrivances, elsewhere.

Now

Now whereas *Glauber* prescribes to mingle with the Distill'd Liquors of Harts horn rectified Spirit of Wine, to wash out the volatile Salt, and directs the Distilling again of both those Spirits (of Wine and Harts-horn) together; his method of proceeding may be justly question'd: For first, dephlegm'd Spirit of Wine will not so readily, in the way he supposeth, dissolve the volatile Salt of Harts-horn; And next, the Spirit this way drawn is not a simple Spirit of Harts-horn, but a compounded Liquor of the Spirit of Harts-horn, and that of Wine; the latter of which may possibly, in divers cases, rather impair then improve the vertue of the former. For Spirit of Harts-horn, by reason of its opening and resolving, as well as Cordial Vertues, is safely and successfully given in Feavers, wherein it is not observed to inflame the Blood, whereas Spirit of Wine in such cases is counted dangerous. And this brings into my thoughts a very questionable Preparation of the Experienc'd and Ingenious *Hartman*, who much extolls, for the Worms in the Stomach, Spirit of Harts-horn in general, but especially that which he is pleased to call *Essentificated* (that is, as himself expounds it) with which its own fix'd Salt, extracted with some convenient Water, and its volatile duely depurated, have been dissolved and united. For first, The fix'd Salt of Harts-horn hath been perhaps never yet prepared by any Man; and if Harts-horn doth yield a fix'd Salt (as I dare not absolutely deny, but that out of many Pounds a few Grains may be extracted) it may well be doubted whether that Salt be endowed with specifical Vertues: And next, The Spirit of Harts-horn, if it be well dephlegm'd, will not (for ought I could ever finde) dissolve its own Salt, unless assisted by the External warmth of the Ambient Air; Insomuch that I usually keep the Spirit and Salt in the same Vial, where they remain unmix'd;

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unmix'd; and the Spirit that will dissolve any of its owne Salt I account not sufficiently dephlegm'd, but to have yet an Aqueous alloy whereby the Salt is imbibed. And I remember that having once exquisitely rectified some Spirit of Hartshorne, and closed it up in a Viall, after divers months it let fall a considerable quantity of Volatile Salt, so far was it from being able, without the help of some peculiar way, to have dissolved more, had I cast more into it. I deny not that the Spirit of Hartshorn may, by the mediation of heat, be brought to take in some of the Salt of the same Body, but of what use this violent Impregnation of the liquor can be, unless it be quickly administred, I do not yet understand, having often seen the Spirit let fall againe in the cold, the volatile Salt it had dissolved by the assistance of heat.

And having thus, *Pyrophilus*, laid before you the difficulties we have met with in the above-mentioned waies of making of Spirit of Hartshorne proposed by Authors (neither of which we would yet have you altogether reject) I must acquaint you with our having attempted a fourth way, which when the matter to be distilled is not very much, I choose rather to practise then any of the other, as hitherto seeming more safe and free from inconveniences. Take then (for Instance) two pounds of Hartshorne broken on an Anvill into pieces, each of about the bigness of ones finger (for if it be rasped there is danger that it should emit its fumes too plentifully at once) and put it into a strong glasse Retort uncoated, big enough to containe at least twice as much matter; Set this in Sand, aud fit to it a pretty large and strong (either single or double) Receiver; then give a slow fire for three, foure, or six houres, to send away first the Phlegme, and more fugitive parts of the Spirit; then encreasing the fire, but warily, and gradually for divers houres, drive over the Spirit (which is

wont

wont to drop downe somewhat tincted) and the more volatile parts of the Salt; and at length intend your fire till the bottom of the Retort be glowing hot, and heap also at last quick coals upon the sand round about the Retort to give, as it were, a fire of Suppression, and so force over the more sluggish remaining remaining parts of the Salt, and with it the Oyl: all which are to be afterwards proceeded with, according to the Directions given concerning the Spirit Salt and Oyl of Mans Blood: which having bin sufficiently insisted on before, will not(I suppose)need to be repeated now. Only it may not be impertinent to advertise you. 1. That we have more then once had the bottom of the Retort melted, yet not broken, the melted glasse being supported by the substrated sand. 2. That sometimes in Filtration, some of the thinner parts of the Oyl have unperceivedly passed through the paper with the Spirit, and Salt, and have not been discovered, but by Rectification, wherein I have almost admired to see the Oyl with a gentle heat of a Lamp ascend to the top of a very tall head and body; touching which circumstance it may yet be further enquired, whether it proceed barely from the volatilnesse of the Oyl it selfe, or also from its being carryed up by the Salt and Spirit wherewith it was associated. 3. That by this way of distillation we usually have out of a pound of Hartſ-horne between foure and five ounces, (seldome or never so little as foure, and often nearer five) of volatile Salt, Spirit, Oyl, and Flegme; (of the last of which, if the Hartſ-horne be not recent, there will be no great quantity) and when we distill'd two pound of the matter at a time, we found the operation to to succeed altogether as well, and to yeeld us a fully proportionable quantity of Liquor.

The vertues of the Spirit and Salt of Hartſ-horne, which differ not much in Dose, or Efficacie, are probably very great

in

in divers distempers, wherein we have yet made no tryall of them. For they are considerable in resisting Putrefaction, comforting nature, opening Obstructions, mortifying the the Acidities it meets with in the blood, and, by rendring that volatile, promoting its Circulation, we have knowne considerable effects of it in Feavers, Plurisies, Obstructions of the Mesentery, and Spleen; and chiefly (which perhaps you will think strange) in Coughs and Distempers of the braine, and nervous parts; in so much that I have by Gods blessing sometimes stopt very violent (but not inveterate Coughs) with this medicine in a few houres. And prescribing it to one who was almost daily assaulted with Epilepticall fits, a few *Doses* of it did in a pretty while at first make his fits come but seldome, and after not at all: But whether he be perfectly cured not having heard of him of late, nor having had oportunity to make further tryall of the medicine in that disease, I am not certain. Wee prescribed it likewise, not long since, to a Person who had long lain both distracted, and almost bed-rid, and was in a short time strangely reliev'd by the use of it, though not perfectly cur'd (perhaps because the Patient tooke but little of the medicine, we being then not well stored with it;) and on some that have been by Feavers rendred stupid, it hath had very eminent Operations: but for a further account of its vertues, I must referre you to the particular Narratives, I may when wee meet, give you, by word of mouth: and till then it may suffice to tell you that it workes chiefly by Sweat (and somewhat by Urine) without being observed to leave behind it such heat as divers Sudorificks are wont to do: only there must be care not to administer it when the *Primæ viæ*, and passages are too much stuff'd and choaked up by grosse Humours, lest by agitating the blood, and putting it into a nimble Motion, it occasion greater Obstructions. The Dose

is from five drops, or graines to a drachme (ten or fifte ene drops are wont to make mee ſweat) in Wine, *Carduus Benedictus* water, or any vehicle appropriated to the diſeaſe; onely taking care that nothing acid be adminiſtred with it, becauſe Acid and Sulphureous Salts mortifie, and diſarme one another. *Hartman* commends it againſt the wormes of the ſtomacke, againſt which it may very probably be available, by reaſon of its penetrant, and ſaline nature, and its emnity to Putrefaction: *Glauber* writes that the Oyl rectified from Salt of Tartar, cares Quartanes, and inward wounds, and cures the paines produced by Falls, Contuſions, &c. being adminiſtred from ſix to twenty drops to a patient placed in his bed to ſweat after it: but of this my Experience will not enable mee to ſay any thing. And I feare *Pyrophilus*, that I have already too long entertained you about Hartſ-Horne: and yet I feare too, that you expect that before I forſake this Subject I ſhould ſay ſomething to you concerning a much controverted particular relating thereunto. The Inquiry is, Whether or no, when it is diſtill'd, the Salt diſpoſe it ſelfe in the Receiver into the figures of Hartſ-horne, the Affirmative is maintained by many Chymiſts, and a friend of mine who is very ſevere, and not at all credulous, having aſſured mee that he himſelfe had obſerved the inſide of his Receiver over-laid with ſuch figures or hornes, I dare not deny, but that accidentally the particles of the volatile Salt may ſometimes repreſent as well the ſhape of Hartſ-hornes, as of divers other things. But for our parts having ſeverall wayes, and not unfrequently diſtilled that matter, we could never ſee the pretended Saline Hartſ-hornes ſo clearely as we thought wee ſaw cauſe to eſteeme that thoſe who affirm'd they conſtantly ſaw them ſo diſtinctly lookt through the ſpectacles of preposſeſt Imagination: not to mention that it is the uſuall

method

method of nature in Salts to make the bigger Concretions of the ſame figures with the ſmaller graines, as we obſerve in Nitre, Rock-allum,&c. And the graines of the Salt of Hartſ-horne, though I have attentively enough conſider'd their ſhapes, I remember not ever to have obſerved of a figure like that of the hornes they came from: but it is the nature of volatile Salts to faſten themſelves to the Receiver in various figures, according as the degree of fire that urges them up, and other concurrent circumſtances do chance to exact; and conſonantly hereunto we have often obſerved the volatile Salt of the ſame Hartſ-horne to be very variouſly figured in the ſame Receiver: and I remember that not long ſince ſubliming ſome volatile Salt of Urine, it adher'd to the upper part of the veſſell in figures, much liker Hartſ-hornes, then ever I had ſeene their volatile Salt make up; ſo that unleſſe wee will merrily ſay, that the man whoſe urine was diſtill'd, had hornes given him by his wife, wee muſt acknowledge that nature ſeemes to give her ſelfe liberty to play in the Configuration of volatile Salts, and that caſualities have no unuſuall influence on them; or to ſpeake more properly, that the various degree of Fire, the differing copiouſneſs of the Fumes, and many other intervening accidents do keep thoſe Configurations from being conſtantly regular; and I remember that a while ſince filtring through Cap-paper a Tincture of glaſſe of Antimony, made with Spirit of Vinegar and Spirit of Wine, almoſt according to *Baſilius*; the matter which remained in the paper (which was placed in a glaſſe funnell, and was of the ſame ſhape) did of it ſelfe, when it began to grow dry, cleave into the figures of trees, whoſe trunkes, greater boughs, and ſmaller branches, were both for their ſhape, and proportion, as lively repreſented as if they had been drawne by the curious penſill of ſome skilfull Painter; which paper I ſhewed to ſome perſons

that beheld it not without wonder, and for ought I know I am yet able to ſhew it you; nor is this the only inſtance I could give you if need were, if I had not trifled too long already to manifeſt at preſent, that now and then, Chance may make Nature ſeem to emulate Art.

But as long as I have dwelt, *Pyrophilus*, on this Subject before I paſſe to another; I muſt not forget to advertiſe you, that in caſe Stags Horns cannot be procured for the preparation of the above mention'd Remedies, you may without much diſadvantage ſubſtitute Bucks-horns in their ſtead; for almoſt all the trialls we have had opportunity to make of the Medicines we have been lately diſcourſing of, have been made with Remedies whereto Buck-hornes afforded Materialls.

I had almoſt forgot, *Pyrophilus*, to tell you, That to keep the rectify'd Spirit of Harts-horn, Blood, or the like, is more uneaſie, then any thing but trial would make one think; and yet to keep the Volatile Salt is more difficult, then to preſerve the Spirit; for more then once, when I have kept theſe fugitive animal Salts by themſelves, they have penetrated the Corks, and ſcarce left me in the well ſtopp'd Glaſſes any footſteps of their having been there, and therefore thoſe Chymiſts that are not ſtrangers to theſe Salts, have taken much pains to no great purpoſe to keep them from Avolation, ſome of the recenteſt and ingenioueſt are wont, that they may moderate their uncurb'd wildneſs, to pour on them as much of ſome ſuch Acid Spirit, as that of Salt of Vitriol *&c.* as will produce any manifeſt conflict with the Volatile Salt, never conſidering, that as this courſe doth indeed deveſt them of their fugacity, ſo it doth in effect deveſt them of a great part of their Nature, and conſequently of their peculiar Vertues. For I have elſwhere ſhewn, that the Saline Corpuſcles, obteinable by the

Fire

Fire from Urine, being united with a ſufficient proportion of Spirit of Salt, will ceaſe to be what they were, and with the Saline parts of the Acid Liquor, will make up a kind of *Sal-Armoniack*. But 'tis eaſier for me in this our caſe to ſhew that another mans Expedient is not good, then to ſubſtitute a good one, eſpecially in this place, where for ſome Reaſons I muſt not ſet down, the way that I the beſt approve of, onely I ſhall tell You, that my way long was, nor do I yet deſpiſe it, to preſerve volatile Salts in their own rectify'd Spirit, which ſwimming over them, kept them from the immediate contact of the Air, and preſerv'd them ſo well, that by this means I have ſecur'd even ſmall parcels of the fugitive Salt of humane Blood for many Years.

[*But ſince the Spirit and Salt even of this ſort of Horns, will not, I fear, be found ſo eaſie for every Man, eſpecially, if he be a Novice in Chymiſtry to procure in any conſiderable Quantity; and ſince the declared intent of my communicating to the Reader my Obſervations about theſe Spirits of Harts-horn, Blood, &c. was to furniſh him with ſuch Chymical Remedies, that men may by their eaſineſs and cheapneſs be invited to provide them for the uſe of the Poor; I preſume it will not be improper to preſent him with a* ſuccedaneum *or two, that may be eaſily enough obtain'd from* Sal-Armoniack, *though theſe Preparations have ſuch Connexion with divers other Paſſages, wherewith they were VVritten to the Perſon, I here call* Pyrophilus, *that to avoid the too much diſmembring thoſe Papers, and to make theſe Proceſſes the better underſtood, I muſt content my ſelf to leave out thoſe Particulars that can beſt be ſpar'd, hoping that the reſt will be eaſily excus'd, at leaſt by thoſe who know how much ſome Chymiſts themſelves have been deluded in their Trials of the divulg'd Proceſſes, divers of which are either falſe or very uncertain, and others, though they ſhould ſucceed, would give but a ſo-*

phiſticall ſpirit, much of the obtained Liquor comming from the Diſtillable Concretes that muſt according to ſuch Proceſſes be mingled with the Sal-Armoniack, *of which I could eaſily give inſtances, ev'n out of modern and applauded VVriters.*]

The Spirit of Salt-Armoniack, *Pyrophilus*, hath ſuch wonders aſcribed to it by Chymiſts, that, if I ſhould conclude theſe Papers touching Spirits of an Urinous nature, without ſaying ſomething to you of that, you might think I had left the conſiderableſt of them unmentioned; but as I the rather acquaint you with the little I know of it, becauſe, though I have met with divers Authors that extoll it, I have ſcarce met with any that teaches intelligibly, and candidly how to prepare it, which perhaps moſt of them did not know themſelves, ſo I hope you will exact an accurate account of it the leſſe rigidly, becauſe I can preſent to you but little on that Subject, beſides the few Obſervations wherewith my own Curioſity has ſupplyed me; having ſcarce ever (to my knowledge) ſeen any Spirit of *Sal-Armoniack* ſave what my own Furnaces have afforded me, and therefore without preſuming to ſet down ſolemne proceſſes about a ſubject, wherein I have found a ſmall variation of Circumſtances hinder the operations made on it from producing uniform effects, I ſhall content my ſelf to give you as true an information as my memory will afford me of a few of my proceedings with this nice Salt, and the ſucceſſes of them: only premiſing in a Word, that by *Sal-Armoniack* I here mean the Factitious and Venal, conſiſting of Urine, Soot, and Sea-ſalt.

And firſt, accordng to the way propoſed by *Glauber* (in the ſecond part of his Philoſophicall Furnaces) we diſtilled it out of an open retort (with a Cover to clap on and take off as occaſion requires) with a mixture of *Lapis Calaminaris*, and once we, that way, obtained a quantity of Liquor, which ſeem'd exceeding

ceeding ſtrong, but before we could make any trials with it, the Viall that contained it having bin accidentally broken, we loſt the opportunity of ſatisfying our ſelves of the efficacy of it: and having not long ſince attempted to make ſuch a Spirit the ſame way, there came over indeed a Liquor which ſeem'd to be the Spirit of *Sal-Armoniack*, but when we came to Rectify it in a gentle heat, the greater part of it to our wonder, coagulated in the Retort, whereinto it was put to be diſtill'd, into a perfect *Sal-Armoniack*, (a pretty quantity of which I yet keep by me) and thereby betray'd the above mentioned Liquor to have been little elſe then the *Sal-Armouiack* it ſelf, forced over by the violence of the Fire, without having ſuffer'd any ſeparation of its Ingredients. Nor is it by us alone, that the Proceſs ſet down by *Glauber*, hath been unproſperouſly attempted, and yet perhaps it might have conſtantly enough ſucceeded with him, and the difference of the *Lapis Calaminaris* (in which we have obſerv'd much diſparity according to the places it comes from) may have produced the complained of variety of Succeſſes.

We alſo attempted to diſtill a Spirit from *Sal-Armoniack* (to pretermit divers other trials) by mixing it with equall parts of Salt of *Tartar*, but in this experiment we met with variety of ſucceſs, for having exquiſitely incorporated the two Salts by the help of a little fair Water, we have divers times had the upper part of the receiver (carefully luted on to a ſomewhat large retort) all candy'd over on the inſide; with Volatile Salts of ſeverall ſhapes, and the Liquor afterwards forc'd over hath ſometimes remained long enough in the forme of a very ſubtle and penetrant ſpirit, and ſometimes again, it hath in the very receiver almoſt totally coagulated it ſelf into a lump of Chryſtalline Salt; and when we had mixt the Salt of *Tartar*, and *Sal-Armoniack*, without any Water

or

or other moisture at all, our successes have been very like those above mentioned. Upon this occasion I dare not omit acquainting you with an Experiment, which yet I learn't not upon this occasion, Take of pure Salt of Tartar and of good *Sal-Armoniack* equal parts (let them be both very dry, or else you may loose your labour) and grind them very accurately together, though you be deterred from continuing that toyl, by a very subtle and fetid Urinous steam, wont to exhale from the mixture; these Salts being thus exquisitely incorporated, you must put them into a large Glass Retort, to which you may fit a Receiver to catch a fetid Liquor that sometimes we have observed to come over; then administring by degrees a very strong Fire, the top and Neck of the Retort, will be lined with a pure white Sublimate, which seems to partake as well (though nothing neer so much) of the Salt of *Tartar* as of the *Sal-Armoniack* and of it's Qualities, and yet to differ from either; and though this Sublimate be far enough from being the true Volatile Salt of Tartar so highly extolled by *Paracelsus* and *Helmont*, yet it is no ignoble Medicine in obstructions, and some other distempers: And I remember one of the most expert Chymists I know, having made trial of some I presented him, told me he found such effects of it, as made him divers times very pressing and sollicitous for more. The Fetid Liquor that will come over we have found sometimes to be very little, and at other times much more copious, without being able to discern clearly whence the disparity proceeded; and the *Caput Mortuum* remaining in the Retort, by Solution, Filtration, and Coagulation, affords a pure Salt of greater Diureticall efficacy, then almost any I have hitherto met withall: Another way by which we attempted to obtain a Spirit of *Sal-Armoniack*, was by accurately mixing two parts of it, with three

or

or foure of Quick-lime, whose vertue had not bin impair'd by being exposed to the Air, this mixture being distilled in a Retort, placed in sand, with a strong fire afforded us (together with some dry Sublimate in the neck of the Retort, and as I remember a little volatile Salt in the Receiver) a very strong and yellowish Spirit, so exceedingly penetrant, and stinking, that 'twas not easie to hold ones nose to the open mouth of the Vial wherin 'twas kept, without danger of being struck downe, or for a while disabled to take breath, by the plenty and violence of the exhaling Spirits: But the Liquor forced over by this method, though exceeding vigorous as to its Qualities, was inconsiderable, as to its Quantity; and therefore wee now chuse to vary a little this way of proceeding, and and let the Quick-lime ly abroad in the open Air; (but protected from all other moisture, except that of the Aire) for divers dayes, in which time the imbib'd humidity of the ambient Air would in some degrees slake it, and make it somewhat brittler then it was before, and the Lime thus prepared, being mingled with Salt-Armoniack, and distilled in all circumstances after the former manner, afforded us a Liquor so copious, and yet so strong, that we hitherto acquiesce in this way of distilling this wild Salt, as the best we have yet met with. But note, that, we used towards the latter end to encrease the fire to that degree, by heaping up Coales on the upper part of the Retort, that, the mixture in the Retort hath been brought to flow. Note also, that though even the Spirit thus drawne persevered long in the forme of a Liquor, yet yesterday coming to looke upon a Viall of it, which we reserved, to try what effect time would have on it, we found that about a fourth or fifth part of it had spontaneously coagulated it selfe into exactly figured graines of a Chrystalline Salt, the Liquor swimming above it, retaining, nevertheless,

a very ſtrange ſubtlety: Which Obſervation concording with divers others makes mee apt to doubt, whether or no this ſo celebrated Spirit of Salt-Armoniack be really much, if at all, other then the reſolved Salt of Urine, and Soot, of which that body conſiſts, ſomewhat ſubtiliated by the fire, and freed from the clogging Society of the Sea-ſalt, to which they were formerly aſſociated and united; though I confeſſe it ſeemeth not improbable, by the great Energy which may be obſerved in this Spirit, when it is dextrouſly drawne, that the entire Concrete, and the Quick-lime, may afford it ſomething that it could not receive from either of the Ingredients, whence the Mixture did reſult, as we ſee in *Aqua Regis*, which diſſolves crude gold, though neither the Salt-Armoniack, nor the Peter, nor the Vitrioll alone affords, by the uſuall wayes, Spirit capable of producing that effect. The great vertues, and uſes of Salt-Armoniack, eſpecially in Phyſick, I cannot now ſtay to treat of, but you will find them largely enough ſet downe by *Glauber*; whoſe Encomiums nevertheleſſe, muſt not be all adopted by mee, who in this place mention the Spirit of Sal-Armoniack, but as a Medicine that is neer of kin, and may ſerve for a *Succedaneum* to the Spirits of Hartſhorne, Urine, Blood, &c.

But although the laſt mentioned way, *Pyrophilus*, be the leaſt imperfect one we have hitherto met with, of diſtilling Salt-Armoniack, yet becauſe you may ſometimes need a Spirituous liquor impregnated with the activeſt parts of that noble concrete when you want either Retorts to diſtill in, or Furnaces capable of giving ſtrong fires, I dare not omit to inform you, that, we have ſometimes drawne over ſuch a liquor of Salt-Armoniack after the following manner. Diſſolve pure Salt-Armoniack in a ſmall quantity of faire water, then in a Cucurbit put ſuch a quantity of ſtrong Quick-lime powder'd,

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as may fill up a fifth or fixth part of the veſſell, and water it very well by degrees with the former Solution of the Salt-Armoniack, and immediately clap an Alembick on the Cucurbit, and faſten a Receiver to the Alembick, cloſing the joynts very acurately, and from this mixture, by the gentle heat of a Bath or a Lamp, you may obtaine a Liquor that ſmels much like Spirit of Urine, and ſeemes to be much of the ſame nature; and this volatile liquor being once or twice rectified *per ſe*, with a very mild heat, growes exceeding fugitive and penetrant, and workes by Sweat, and a little, perhaps, by Urine; and I remember that when I firſt made it, having been induced by ſome Analogicall Experiments, I had formerly made, to give it to one that had a patient troubled with an extreamly violent Cough, I had an account quickly brought me, that he not ſlowly, but wonderfully mended upon the very firſt or ſecond Doſe; and indeed the tryalls that have hitherto been made of it, make mee hope that it will prove little inferiour in efficacy to the other above mentioned more coſtly Spirits, ſcarce any of which being preparable by ſo ſafe, and compendious a way, if this Medicine emulate them in vertue, the Eaſineſſe of the preparation (wherein little time needs be ſpent, and leſſe danger of breaking veſſels incurr'd) will much endear it to me. But, *Pyrophilus*, becauſe I would aſſiſt You to make variety of Experiments about Volatile Salts, and becauſe diverſe tryals may be more conveniently made, when the Saline Corpuſcles are in a dry form, then when they are in that of a Liquor; I will take this occaſion to mention to You a way by whoſe Intervention a change on the fixt body employ'd about the newly mentioned Experiment, hath ſometimes afforded mee ſtore of volatile Salt. This way was only to mingle exquiſitly a quantity of Sal-Armoniack, with about thrice its weight of ſtrong Wood-aſhes. For the Spirit that

we this way drave out of a Retort plac'd in Sand, did quickly in the Receiver Coagulate into a Salt; and this Method was again experimented with like succeſſe. And the Salt thus made we found ſo extreamly ſubtile and volatile, that it ſeem'd to be much of the ſame Nature with that of Urine, and if it be indeed, (as probably 'tis) onely the Volatile Salts of the Urine, and perhaps alſo of the Soot, whereof the *Sal Armoniack* conſiſts, this may paſſe for a more compendious way of obtaining ſuch Salts, then others that are hitherto wont to be practis'd amongſt Chymiſts. But I will not undertake that this way of obtaining rather Salt then Spirit ſhall conſtantly ſucceed, Yet if you find it do not, I ſhall not perchance refuſe You a better way. But if you could deviſe a Method (which poſſibly is not unattainable) of bringing over into a Spirit, not the bare Urinous and fuliginous Ingredients of *Sal-Armoniack* but the whole Body, it may be, you would have a *Menſtruum* that would make good, if not ſurpaſs even *Renanus's*, and *Glaubers* Elogies of the Spirit of *Sal-Armoniack*.

The affinity betwixt Volatile Salts and Sulphurs, doth, *Pyrophilus*, as well as your Curioſity invite me to acquaint you, with ſome of the Trials we have made about the Preparations of Sulphureous Fetid Liquors, which I am the more inclined to do, becauſe, though I find mention made of ſome of them in Chymical Books, yet they are there delivered with ſo little Incouragement, amongſt many other proceſſes of which it appears not that the preſcribers made trial, that when I had diſtilled ſome of thoſe Sulphurs, divers expert Chymiſts were very deſirous to have a ſight of them to ſatisfy themſelves that ſuch Liquors could be ſo prepared. The way of making the common Balſam, or Ruby of *Sulphur*, is too well known to need to be long inſiſted on. Onely, be-

cauſe

cauſe there is ſome little variety uſed by ſeveral in the prepa-ration, it will not perhaps be amiſs to inform you that we are wont to make it by mixing about three parts of Oyl of Turpentine, with two of good Flower of Brimſtone, and ſetting them in a ſtrong Urinal ſlightly ſtopt in an heat of Sand, only great enough to make the Liquor with a little crackling noiſe (whenceſoever that proceeds) work upon the *Sulphur*, till it be all perfectly reſolved into a Bloud-red Balſam which will be performed in ſix, eight, or ten Houres, according to the quantity of the Ingredients to be united; this Balſam which is indeed in ſome caſes no deſpicable Remedie, is by vulgar Chymiſts, according to their cuſtome very highly extolled, and ſometimes employed in Diſtempers and Conſtitutions, wherein inſtead of performing the wonders by them expected, its Heat doth more harm, then its drying and Balſamick properties do good: but yet apparent it will be, by what we ſhall ſay anon, that by this preparation, the Body of the *Sulphur* is ſomewhat opened, and therefore (as we ſaid) in ſome caſes the Ruby of *Sulphur* may prove no ineffectual Remedie, which may probably be improved if it be prepared by bare Digeſtion in a very gentle heat, by which courſe we have proſperouſly prepar'd it, though not in ſo ſhort a time, when we made it not in order to ſome other Medicine.

To Volatilize the *Sulphur* thus Reſolved we took the Balſam made the former way in a few Houres, and putting it in a Retort, either with, or without fair Water, which is ſuppoſed to help to carry up the ſuperfluous Oyl, we placed the Veſſel in a Sand Furnace, and with a gentle heat drawing off as much of the Oyl of Turpentine as would in that heat come over, we ſhifted the Receiver, and carefully luted on the new one; and laſtly, giving Fire by degrees, we forced over a Liquor of a deep and darkiſh Red, extreamly penetrant, but of a ſmell

so sulphureous and diffusive of it self, that it was scarce to be restrained by Corks, and was by great odds stronger then that of the Rubie before distillation.

The like Experiment we tryed in a Glasse head and body placed in Sand, and through that way, likewise we obtained a Volatile Balsam of *Sulphur*, yet we found it too inconvenient to be equallable with the former; what long Digestions of this Liquor will do to take away, or lessen its Empyreumatical and offensive Odour, we have not yet been by experience satisfied no more then of its medical Vertues, though probably the great penetrancy of the Liquor considered, they will not be languid.

Authors also prescribe the making a volatile Balsam of *Sulphur*, by driving over, after the above mentioned manner, a Solution of Flower of Brimstone in Linseed Oyl, and this Remedy they highly extoll; but though it may probably prove a good Medicine, yet since they commend it but by conjecture, and not upon Experience, I see no great reason why it should be preferable to the other; for we find that express'd Oyles are much more apt to receive an offensive *Empyreuma* then Oyl of Turpentine, which being much more volatile then they, requires nothing neer so violent a heat to make it ascend; and unless it be found, that the Sulphureous particles are able to mitigate the corrosive ones, the distilled Liquor of an express'd Oyl may prove noxious in the Body. For by purposely (for trials sake) distilling Oyl Olive, by it self, though not in a naked Fire, we obtained a Liquor of that exceeding sharpness, that it would (taken inwardly) probably corrode, or fret either the Stomach or some other of the internal Parts.

There is another way of preparing a Sulphureous Balsam, to which *Penotus* no ignoble Chymist, ascribes such stupendous

dous Vertues, that though I have not yet made trial of it in Diseases, yet I dare not leave it altogether unmentioned; the process being briefly but this. Take good Balsam of *Sulphur* made with Spirit or Oyl of Turpentine, and having freed it from its superfluous Oylinesse pour on it well deplegm'd Spirit of Wine, and therewith draw by affusion of new Spirit as often as need requires a sufficient quantity of a Red Tincture, which by filtration and abstraction *in Balneo* must be reduced to a Balsamick consistence; this Liquor you may if you please by degrees of Fire drive through a Retort placed in Sand, and thereby obtain a volatile Balsam of very great penetrancy, and probably of no small efficacy; but the Trial I have made of this process, gives me occasion to advertise You;

1. That unlesse your Balsam be reduced to a stiffe thicknesse, and almost to drinesse it self, the Operation will hardly succeed, we having fruitlesly digested for some months Spirit of Wine upon Balsam, whose consistence was somewhat too Liquid.

2. That as soon as the Spirit of Wine is sufficiently Tincted, it ought to be Decanted, and succeeded by new, lest by too long digestion, instead of heightning its Tincture, it let fall that which it hath already acquired.

3. That upon a very slow abstraction of most of the Tincted Spirit in a digesting furnace, we once found the remaining Liquor not to be in the forme of a Balsam, but to consist partly of Spirit of Wine; and partly of a seeming distinct Oyl, whereinto the Sulphureous Tincture was reduced. The Balsam of *Sulphur* thus made without Distillation seems likely to be an innocenter and nobler Medicine then the common Ruby of *Sulphur*, made with a hot and ill scented Oyl of Turpentine: and by this preparation may also appeare

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the truth of what we formerly ſaid, when we told you, that the body of the Sulphur was opened by Solution in Oleaginous Liquors, for out of the common thickned Balſam, as you may be informed by this proceſſe, well Rectified Spirit of Wine will, in a ſhort time, extract a blood red Tincture, whereas by long digeſtion of Spirit of Wine alone upon pure, but undiſſolved, flowres of Brimſtone, we could not diſcerne any change of colour in the *Menſtruum*; though I dare not deny the poſſibility of what ſome Authors affirme, who write, that Spirit of Wine very excellently Dephlegm'd, will in time, of it ſelfe draw a Tincture from flowers of *Sulphur*, which Tincture they yet pretend not to make of a higher then a Lemmon colour. And by the way let mee tell you, that our red tincture formerly mentioned is (if it be well made) ſo ſtrong of the *Sulphur*, that probably it would make a very penetrant, and effectuall outward remedy in Aches, and divers other cold diſtempers of the nervous parts; for it hath been already found, that good Spirit of Wine alone is one of the powerfulleſt Fomentations in divers caſes of that nature; (inſomuch that it hath been ſometimes found to arreſt the ſpreading Mortification of Gangrenes;) and therefore being ſo richly impregnated with *Sulphur*: which is even without the aſſiſtance of ſo ſubtle a vehicle very available in many diſſaffections of the *Genus Nervoſum*; 'tis probable that the skilfull aſſociation of two ſuch active remedies may produce conſiderable Effects.

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Take of pure flowers of *Sulphur* one part, of the beſt Oyl-Olive foure or five parts, mixe them well together in a ſtrong earthen pot, able to contain a much greater quantity of the ingredients then is to be put in it: ſet this veſſel over a moderate fire

fire of Charcoales, throughly kindled, till the Oyl though slowly, have perfectly dissolved all the Flowers of *Sulphur*, which will (if you worke it well) be perform'd in about halfe an houre, or an houre, (according to the quantity of your Materials;) But you must have a great care, during the whole Operation, first, that the Oyl catch not fire, whereby it would not only be lost it selfe, but perhaps endanger the firing of the house; and next that the Mixture be kept nimbly, and constantly stirring from the first beginning of the Oyl's action on the *Sulphur*, till the Solution be fully made; and the Pot (having been taken off the fire) be grown cold again.

The chiefe Signes whereby you may perceive, that, you have not erred in the Operations are, *First*, if the *Sulphur* be perfectly dissolved in the Oyl, which you must often try before you take it from the fire, by taking up with the tip of a stick a drop or two of the Liquor yet in Preparation, and letting it coole on white paper, or on your naile, whereby you may discerne, when the Solution is perfectly made by the deep Redness, and Transparency of the Liquor, and by its containing no more in it any undissolved Powers of the Brimstone; *Next* by the Consistency of the Balsam which ought to be neither too Liquid (as you will find it if it hath not staid its due time on the fire) nor too thick (as it is apt to become if you remove it not seasonably from the fire;) but of the consistence of somewhat thin Hony; and lastly, by the smell which ought to be strong of the *Sulphur*, but not of the fire; for though the Sulphureous Stink is, in this Remedy, to be expected, that Empyreumaticall one, which proceeds from burning (and by skilfull nostrils may be easily discerned,) is very possible to be avoided.

The *Dosis* of this Balsam, when it is to be inwardly used, may be from two to fifteen, or twenty drops, according as

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the greatneſſe of the diſtemper, and chiefly the ſtrength, and Conſtitution of the Patient ſhall require and bear. It may be given upon a faſting Stomack, either alone, or brought to the Conſiſtence of Pills, or of a *Bolus* with powdered Sugar, Liquorice, &c. or elſe diſſolved in any convenient Vehicle, wherewith its Oleaginous nature will permit it to mingle. Outwardly it may be adminiſtred either by bare Inunction of the part affected, or elſe by incorporating it with any other convenient Oyntment, or Playſter: after which we are wont to preſcribe to have an application made to the part of two or three little Bags fill'd with Sand, as warme as the Patient can eaſily endure it, and ſhifted as ſoon as either of them begins to cool, that by this meanes, the Pores being open'd, the Vertue of the Balſam, by being made more penetrant, may reach the farther.

I have been thus particular, *Pyrophilus*, in the mention of this Remedy, becauſe though it ſeem but a ſlight and triviall Preparation, yet Experience hath given us better opinion of it, then I feare the ſlightneſſe of the Preparation will as yet allow You. And indeed its Vertues, I am apt to thinke more then I have yet had occaſion to obſerve, and therefore muſt referre you to *Rulandus* his Centuries, where they are often mentioned: but outwardly in Straines, old Aches, Bruiſes, and the like, it is wont to be very effectuall; in the beginning of Fits of the Gout it hath ſeverall times (though not conſtantly) been proſperouſly applyed both to Mr *B. B:* and divers other perſons, and ſometimes it hath been found not ineffectuall even in the *Sciatica* it ſelfe. And as for Paralyticall diſtempers, I have had by a skilfull Phyſitian an account ſent me of ſcarce credible things which it hath therein performed: to which I ſhall onely adde, that a while ſince I had great thankes returned mee on the behalfe of a faire young

Lady

Lady, to whom I prosperously prescribed it against a great Tumor in her neck, which was supposed to be the beginning of the Kings-evill; But this Tumor was recent enough, which circumstance I thinke fit to specifie, because I feare that if the Scrophulous Tumor had been inveterate, the successe would not have been so good. Inwardly the chiefe Use we made of it hath been in Coughs and Distempers allyed thereunto; but its Balsamicall nature, making it both healing, and resistive (if I may so speake) of Putrefaction, makes it probable that its Vertues may be more extensive; to which purpose I remember that a while since a friend of mine tryed it with wonderfull successe *in mictu sanguinis ferè deplorato*, having first by a gentle heat reduced it to such a Consistence, as allow'd him to make it up into Pills. But of the particular Cases, wherein our Remedy hath been succesfull, no more at present; We shall rather subjoyn, That though this have been the way which we have the oftenest employ'd in the making of the Balsam, yet we must not conceal from You, that we have divers times met with Accidents, which frustrated our endeavours and expectations. For if the fire administred be too languid, the Solution of the *Sulphur* by the Oyl proceeds not well, and on the otherside have found, that not only a strong heat is apt to burne the matter, or to make the Oyl boyl over, and perhaps take fire, but even that upon a very little excesse in the degree of heat, the Oyl and *Sulphur* would, before it could be expected, degenerate together into a heavy and viscous Lump (almost of the colour of the liver of an Animall) which coagulated Matter prov'd afterwards exceeding difficult to be by the affusion of fresh Oyl dissolved and reduced to a due consistence. Wherefore we tryed to prepare this Balsam by putting the proportion of Ingredients formerly mention'd into a strong Urinall, which we placed in Sand, and making

under it no more fire then was sufficient to make it slowly worke upon the Flowers, (which did often during their Solution make a crackling noise,) we continued the Operation for divers (perhaps many) houres, at the end of which we found the *Sulphur* dissolv'd, and the mixture reduced to a Balsamick colour and consistence. So that if you distrust your dexterity to prepare this Balsam by the former way with a naked fire, we must advise You to make use of this latter way, as that which is the safer, though it be the longer way of proceeding. Nay when we had leisure enough, we did for tryalls sake, prosperously attempt the Solution of Flowres of Brimstone, with common Oyl by the far gentler heat of bare Digestion, and by that meanes obtained a Balsam perfectly free from adustion, but of somewhat too liquid a consistence, which may be easily remedied by the mixture of powder'd Liquorice, Sugar, or any other such convenient Concrete. We must also advertise you that this Balsam may also be prepared with Oyl of Nuts, of Poppy seeds, of *Hypericon*, instead of Oyl-olive, or any other expreſt Oyl, appropriated to the particular distemper against which the Physitian intends to employ the remedy, only care must be had, that the Specifick qualities of the Oyl be not so fugitive, as to be destroyed by the Ebullition requisite to the making of the Balsam, which if it be to be enrich'd with specifick vertues in relation to any particular disease, may perhaps be best prepared by the last mentioned way (of digestion) wherein the subtle Spirits that impregnate the Oyl are not in such danger, to be dissipated by the fire.

The knowingest Chymists themselves (*Pyrophilus*) are wont so much (and perhaps not altogether undeservedly) to to extoll the efficacy of Antimony, that we were thereby invited, besides divers Preparations of it for internall use, to

attempt

attempt the making of some remedies of it, that might also be externally applicable; andin prosecution of this designe, we found that by boyling foure or five fingers height of good Oyl of Turpentine upon very finely powdered Antimony, put with the Liquor into a strong Glasse Urinall, placed in Sand, the Oyl after some houres would grow exceeding high Tincted; and being gently in in great part abstracted, would leave behind it a body of a Balsamick consistence, and a deep redness; which may, I presume, be applyed to resolve, and discusse hard Tumours, and remedy divers other outward Evils, with more effect then the simple Balsam of common *Sulphur* formerly described. And from this Antimoniall Balsam abstracted to a stiffer consistence, we found that Spirit of Wine would draw a Tincture, which I likewise suppose might prove a very powerfull Fomentation; though the Spirit we used (perhaps becaus it was not sufficiently Dephlegmated) did not in a few dayes attaine to more then a very pale redness:) but this Tincture being slowly freed from the most part of the Spirit of Wine, became of the consistence of somewhat liquid Hony, and of a deeper colour, thereby affording us a purer Balsam; which we have not yet, (being hindred by some accidents) attempted to bring over the Helm. Nor did we here desist, but by divers tryals found that the Antimoniall Balsam, above mentioned, being put into a Retort, placed in Sand, and pressed by degrees of fire, would at length emitt Steams, which would condense in the neck of the Retort, and fall thence into the Receiver in sanguine drops: this volatile red Balsam (especially if by this volatilization the Antimony have lost its Emetick property) we cannot but think endowed with more then ordinary Vertues, outward and perhaps inward too; considering the great penetrancy of the Liquor, and the Energy of the Minerall, with whose

ſubtle parts it is richly impregnated, if it conſiſt not mainly of them. But we are yet in proſecution of this Preparation, and therefore till we have ſeen how far we are like to improve this Remedy, We ſhall forbear any further mention of it eſpecially ſince we have already in this very Paper, given you as we ſuppoſe, ſufficient proofe, that We are more ſollicitous for your Satisfaction and proficiency, then for our owne Reputation, (of being a ſevere Critick in eſtimating of Medicines) For otherwiſe we ſhould not have been ſo indiſcreet, as to acquaint you with any Preparation, of whoſe medicall Vertues we have not yet made much tryall, whilſt we are not deſtitute of other remedies, whoſe efficacy hath been manifeſted to us by Experience. But we have often obſerved, that divers uſefull Chymicall Preparations are mentioned ſo obſcurely, and unintelligibly by the Authors that write of them, or elſe are without any particular, or encouraging note of Diſtinction mentioned amongſt a crowd of other Proceſſes, ſome of which have perhaps already been found to be falſe, or triviall, and others of which may be rationally enough diſtruſted; that moſt Phyſitians, and Chymiſts themſelves, are deterred from attempting to prepare thoſe remedies, not ſo much becauſe they ſeem unlikely to prove conſiderable, as becauſe they are afraid that the Proceſſes are falſe, or fraudulently ſet downe, and conſequently, that concretes of ſuch a Conſiſtence, Colour, Scent, and other obvious qualities, as are aſcrib'd to the Remedies propoſed, are not preparable by the publiſh't Directions. And that you might ſee, *Pyrophilus*, what diſcouragements I have met with even from Artiſts themſelves to keep mee from truſting to Printed Chymicall proceſſes, I thinke it not amiſſe to mention here a memorable paſſage of the famous, and experienced *Alexander Van Suchten*, who is reported to to have gotten more by the practice of Chymicall Phyſick

then

then any of the Contemporary professours of it; for he towards the end of his Booke of the secrets of Antimony (of which he clearly discloseth not any in that Treatise,) gives this account of his Crypticall way of writing; *Quod in hoc Tractatu nullum* Recipe *proposuerim ob id factum est, quod vos seducere nolo,* Recipe *enim illa seducunt juniores Medicos: sed neque à* Theophrasto *ullum* Recipe *Scriptum est, quod ad Medicinam, quin occultum seusum habeat, & in quo nihil vel deerit, vel abundet; & hoc non fit sine magnis causis.* Wherefore make account, that besides that *such* changes of the qualities, of Bodies, may afford much light to Naturalists, he doth Chymists no useless piece of service, that acquaints them with the success of the nobler sort of processes mentioned in Authors, though he should give them little or no account of the Vertues of the Remedies prepared by those Processes; but this I hope is not altogether our case, for besides that our Observations are likely to save You much trouble, and perhaps some mistakes, and mis-adventures, besides that (I say) we have had oportunity to observe such eminent effects of severall of the volatile Liquors described in these Papers, as may justly give us promising Expectations of the Properties of the rest, which are in their obvious qualities so neer of kin to them. And this sort of Medicines having been found sometimes to do wonders, and generally to be safe (which of a few of the known operative, and not Specifick Medicines can be truly affirmed) I not apt to thinke, that he that shall bring these Remedies in spight of their ill Scent, into the good opinion of Physitians, may make no inconsiderable number of Patients beholden to him.

I should not, *Pyrophilus*, proceed to make You repent Your Curiosity to know my thoughts of the Urinous, and Sulphureous Remedies it hath hitherto made me treat of, were it not,

that

that there yet remaines ſomething to be ſaid, without which, all that hath been ſaid, will ſcarce ſignify very much towards the effectuall recommending of thoſe medicines to Your eſteem and practiſe.

For I do not ignore, *Pyrophilus*, that not only the Generality of the Galenicall Phyſitians, but divers of the more eminent, and judicious of the Chymiſts themſelves, have been pleaſ'd to condemne the internall uſe of Liquors driven through a Retort, by the violence of fire, upon the ſcores of their being offenſively Empyreumaticall, and Stinking; among which ſort of Liquors I cannot expect, that our Spirits of Blood, Hartſ-horne, &c. will eſcape the being reckon'd. But foraſmuch as the proſperous Effects I have had oportunity to ſee, of divers Remedies of that Natnre, have given mee for them rather an eſteem, then either a deteſtation or contempt; I ſuppoſe it may prove no unſeaſonable piece of Juſtice to the Spirit of Blood, and the other Noble, though fetid Remedies I have been ſetting you down; nor no unſerviceable piece of Charity to Men, if in this place, and once for all, I ſpend ſome lines in endeavouring to reſcue theſe criminated Medicines from the great Prejudice they ſuffer under, and from a reputation, which whilſt it renders them more odious then even their ſmell can do, is likely to make men deny themſelves the benefit of them.

I might *here* on this Occaſion call in Queſtion, whether not only Galeniſts, but even many Chymiſts themſelves, be not ſomewhat more afraid, then they need be, of what they call *Empyreuma*. But I will ſuſpend *a while* that Queſtion, and at preſent confeſs to You, that I have ſometimes doubted whether or no that ſtink which is generally call'd by the newly mention'd name, do alwayes, and neceſſarily proceed from the Impreſſions of a violent fire. For to make a pure Spirit, and

and Salt of Urine, there needs nothing, but to let it in a well ſtopt veſſel putrifie for a competent time (as we elſewhere teach) in a Dunghill, or any reſembling warmth, (and that it ſelfe, perhaps, is not neceſſary to its Putrefaction;) and then to draw off an eight or tenth part of the Liquor that firſt aſcends by the gentle heat of a Bath. By which, or by the yet milder warmth of a Lamp-furnace, it may be ſufficiently rectified, and brought to yield, beſides the Spirit, good ſtore of Salt. And ſince the Spirit thus made differs ſo little in Smell or Taſt from thoſe of Blood and Hartſ-horne, that moſt mens Noſes are not criticall enough to diſtinguiſh them, (and We have ſometimes taken pleaſure to make Chymiſts themſelves to miſtake the one of thoſe Liquors for the other.) It ſeems worth conſidering, whether or no the fetid and urinous Taſt and Smell, which in theſe Spirits is ſaid to be Empyreumaticall, and to proceed from the Aduſtion of the fire, be not the Genuine Taſt and Odour of the Spirituous and Saline particles of the mixed Bodies themſelves, which they would manifeſt if they were copiouſly extricated, (to ſpeakin the Kings language) ſeparated from the other *Principles* or *Ingredients* & aſſociated into one Body, though without the violence of the Fire. For to diſtill the Spirit of putrified Urine, wherein the like Smell and Taſt are eminent, there needs (as we ſaid) no greater heat, then that of a Lamp-furnace, or of Horſ-dung, (ſince in the latter of theſe only, Urine too long kept, and but negligently ſtopt, hath been obſerv'd to have loſt its volatile Salt and Spirit, before it was taken out of the Horſ-dung. And ſuch a Heat ſeems not great enough to impreſs an *Empyrema* upon ſuch a Liquor. For we ſee that moſt things diſtill'd in the greater heat of a Bath, are commended by Phyſitians and Chymiſts, for their beeing free from Empyreume. And what Activity may be acquired by the ſubtle parts of a mixed

Body, by the convening (if I may ſo ſpeak) of ſuch Spirituous Particles diſengag'd from thoſe other parts which clogg'd or impriſon'd them, without any Empyreumaticall Impreſſion, from any violent externall Heat, may appear by the Chymicall Oyles of Spices. For though though they be uſually drawn by Chymiſts and Apothecaries, by the help of Water in Limbecks; and though they have by us been drawn after another manner (which we may elſwhere teach You) with a much gentler heat (ſometimes not not exceeding that of an ordinary *Balneum*) yet theſe well Dephlegm'd Liquors retaining ſo well the Genuine Taſte and Smell of the Concretes they were drawn from, that they paſs unaccuſ'd of Empyreume, are ſome of them much ſtronger and hotter then the Spirit or Salt of Mans Blood, or of Hartſ-horn: As may appear eſpecially by the Oyl of Cinnamom, which if pure, is more penetrant and fretting, then any thing but tryall could eaſily have perſwaded mee. And leſt you ſhould object, that the Fire doth conſiderably contribute to the ſtrength of theſe Liquors, otherwiſe then by diſengaging the Particles they conſiſt of from the unactive parts of the Concrete, and aſſembling them together, I muſt advertiſe You, that I have obſerv'd little leſs Heat & Penetrancy then in diverſe of theſe, in ſome Liquors ſeparated without the aſſiſtance of Diſtillation: As for Inſtance, in the purer ſort of the true Peruvian Balſam, and in another kind of natural Balſam, almoſt of an Amber colour, which belonged to an Eaſtern Prince) who carried it up and down with him as a Jewel) whoſe Domeſticks at his death ſold it, whereby I came to procure ſome of it, and found cauſe to wonder at its ſtrength both upon the tongue, and in its Operation. But granting, *Pyrophilus*, that the Volatile Remedies treated of in theſe Papers, may have their offenſive Smell and Taſte imputed to the Fire, yet perhaps Phyſitians would

would more ſlowly, and more tenderly cenſure the Reme-medies in queſtion for their Empyreumaticall ſtink, if they did but conſider, that they themſelves ſcruple not to uſe (to name thoſe among many others) *Senna* and Scammony, though the former be wont to gripe the Guts, and the latter have an Acrimony, Heat, and Mordacity ſo unkind to to the Bowels, that a few grains exceeded in the Doſe turnes it into poyſon; becauſe the ill Qualities of theſe Medicines, may by proper Correctives be ſomewhat mitigated, and the Good they doe, doth more then countervaile the Inconveniencies that attend the uſe of them. For the very ſame Conſiderations, *Pyrophilus*, will be applicable to the excuſe of thoſe fetid Medicines, for which we Apologize: For though the *Empyreuma* or Impreſſion of the fire, for which they are rejected, be the Quality, whoſe abſence from them were very deſirable, yet may that *Empyreuma* by dextrous Preparations be in ſome meaſure corrected (inſomuch that I have known highly rectified Spirits of Urine, by being digeſted for divers months in an exquiſitely ſtopt Glaſſe, brought to be of a Scent, which to mee ſeem'd ſcarce at all ſtinking, and to others even pleaſant) and the prejudice that may be juſtly fear'd from what remains, is advantageouſly recompenc'd by the benefits accruing from the efficacy of their more friendly Endowments. And in effect we find, that the Dogmatiſts themſelves are grown not to ſcruple the adminiſtring the Spirit of Salt, though extorted (if it be of the beſt) by a much greater ſtreſs of Fire, then is requiſite to the Diſtillation of any of the Medicines we defend. And not only the famous *Riverius* (as we have elſwhere noted) extolls the Spirit of Tartar, and Soot, which are yet ſufficiently fetid and Empyreumaticall, but ſeverall other (and among thoſe ſome of our eminent Engliſh) Phyſitians frequently uſe, and commend the Oyl of *Guajacum* forced through a Retort.

And no leſs do divers learned Doctors eſteem, and employ the Empyreumaticall Oyl of Amber: Though (to note ſo much by the way) That be in divers caſes far inferiour to the Volatile Salt, which (if the fire be skilfully adminiſtred) may at the ſame time, and by the ſame Operation be obtained. This Salt, beſides the Efficacy aſcribed to it in the Convulſions of Children, having been lately found by Experience to be an excellent Medicine againſt the Epilepſies, even of well grown Perſons, being adminiſtred in the Doſe of not above a Scruple, or halfe a Drachm, in a due Quantity of Peiony water, or ſome other proper Vehicle.

And on this occaſion You may alſo be pleaſed to take notice, that foliated Gold, is ordinarily and without Scruple employed by Phyſitians, not only to cover Pils, but as a main Ingredient (though how properly I define not) of ſeverall of their richeſt Cordiall Compoſitions extant in Diſpenſatories; and yet to how great a fire Gold is wont to be expoſed before it be melted out of the Oare (wherein 'tis uſually (at leaſt as far as we have obſerv'd) blended with other Metals, and Minerals) and to Purifie it upon the Cupell either with Lead or Antimony: he that is unacquainted with the Operations of Mineraliſts, and the Art of Refiners, will not eaſily imagine. And, *Pyrophilus*, to ſatisfie You yet farther, that the ſtrong Impreſſion of Fire in the Medicines, doth not alwaies make them ſo noxious as they are commonly reputed; let mee deſire you to take notice, that there is ſcarce any Medicament more generally given, and applauded, even by Methodicall Phyſitians then Steel, which is often adminiſtred in Subſtance, made up with other Ingredients, into the Form, either of Pills, or Electuaries. And yet we have wondred to ſee what great Fires, and violent Blaſts of huge Bellows moved by Water-engines, are uſed to melt Iron firſt out of the Stone,

Stone; and if it be to be farther refined into Steel (much of that us'd in Physick being factitious) a new violence of the Fire is requisite: And though after all this to make astringent *Crocus Martis per se* (which is accounted one of the best preparations of it) they are wont to keep *Mars* (as the Chymists speak) amidst reverberated flames, or in some glassmans Furnace for many houres, yea sometimes for divers dayes; Yet this Medicine is with more successe then Scruple daily administred by learned Physitians, in Dysenteries, Fluxes, and other distempers where astriction is required. And 'tis somewhat Strange to mee, that the having been expos'd to no greater a Fire then is requisite to distill Spirit of Blood, or of Hartshorn, should be much urg'd against those Medicines, by those that scruple not to commend, and do almost daily and oftentimes successfully, prescribe the lixiviat Salts of Plants, and particularly of Wormwood, though these are not rightly made, but by the exposing the Concretes even to the violence of an incinerating fire. And as for the unpleasantness of the Smells of our Spirits of Blood, Hartshorn, &c: besides that, to very many Persons there is no Odour so loathsome, as that of a Potion. We find that the Galenists themselves scruple not in the Fits of the Mother (which yet very rarely prove mortall) to repress (as Men are wont to suppose) the unruly Fumes by the Smell of *Castoreum*, *Assa fœtida*, and even the Empyreumaticall Odour of the burnt feathers of Partriges: nor do they decline to use these homely, and ungratefull Remedies to Patients of tendereſt Sex, and higheſt Quality. and indeed in dangerous cases I have known fair Ladies content to think it fitter to take down an ill Scented Medicine, then venture the having their own bodies in few daies reduc'd to worse Perfumes. And certainly we may justly say of Health, as no less then an Emperour said of the gain brought

him:

him in by Urin, That *it Smells well from what thing ſoever it comes.*

But, *Pyrophilus*, if Your Noſtrils were ſo nice, that they muſt needs be comply'd with, though with the hazzard of impairing the Vertues of the Salts they are offended with, I Could propoſe an Effectuall Expedient to gratifie them; and being now invited by ſo preſſing an Occaſion, I ſhall not ſcruple to annex ſomething of it, and tell You, that if we may judge of the Vertues of the Spirit and Salt of Soot (which I am wont to make without addition) by their ſenſible Qualities: they muſt be much of kin to thoſe of the Spirit of Hartſhorn, and of Urine; (though theſe be animall Subſtances.) And therefore having elſwhere more particularly, and by divers Experiments declared the affinity between theſe Salts in divers regards; it will not, I preſume, be look'd upon as an unuſefull or unſeaſonable Hint, if I give You a ſummary, though but imperfect, Account of what I remember my ſelfe to have done, in order to the freeing of the Volatile Salt of Soot, from that very offenſive Smell, which may poſſibly make many, even of thoſe that need them, abominate thoſe Medicines, how Piercing and Noble ſoever, which it Blemiſheth. The Proceſs is as followeth.

Take a Quantity of well Deflegm'd Spirit of Wine proportionate to the Quantity of Salt, whoſe Odour You deſire to correct; into this Spirit drop as much Oyl of *Rhodium*, or of any other Odoriferous Chymicall Oyl, as will ſuffice to make the Liquor as ſtrongly Scented as You deſire it: ſhake the Oyl, and Spirit well together, and if they were both well made, the latter will imbibe the former, and ſometimes be thereby turn'd into a whitiſh Subſtance; with which if it ſmell not ſtrong enough of the Oyl, You may by Agitation incorporate more Oyl, and if You judge the mixture too ſtrong already,

ready, You may dilute it at pleasure, by the affusion of more Spirit of Wine. This done put the Salt of Soot into a Bolthead, or Glass Egge (according to the Quantity that You intend to sublime,) furnish'd with somewhat a long Neck or Stem, and afterwards powring on leisurely Your Odoriferous Liquor, You may with it wash down the Salt that is wont to stick in the Neck of the Glass. After this you must very carefully stop the Vessell with a Cork, and store of hard-wax, if you cannot conveniently, make use of an exacter way of closing it. This Glass You must place in a Lamp furnace, or some other, wherein You may give a very moderate heat, for that will suffice to elevate to the neck and upper part of the Vessell the pure white Salt of Soot, imbued (at the second time, if not at the first) with the Scent of the Odoriferous Oyl, which You imploy'd about the Preparation.

This Experiment, *Pyrophilus*, may prove of that Use in Physick, that it may deserve as well for its Nobleness, as the watchfulnesse, which is requisite in him that makes it, to be illustrated by the ensuing

Observations.

1. Then it is requisite that the Spirit of Wine be very good, For that which is not sufficiently Dephlegm'd, will not readily and perfectly receive into it self the odoriferous Oyl, wherewith it is to be perfum'd. Nor would every Chymical Oyl, although it were well scented, be fit for this Preparation for divers of them as Oyl of Turpentine, and Oyl of Amber will not sufficiently mingle with Spirit of Wine, unlesse they be previously subtiliz'd after a peculiar manner.

2. The Proportion betwixt the Spirit of Wine, and the Oyl that it is to be dissolv'd in, 'tis not easie to determine; for a lesser Quantity will suffice of some Oyl's, then of other. And the Proportion of them must be vary'd, according as You would

would have the ſublim'd Salt to participate more or leſſe of their Odour, and other Qualities.

3. Great diligence muſt be us'd in cloſing the top of the Glaſs, becauſe of the great fugacity, and ſubtilty of the Salt, whoſe Avolation is to be prevented: But then much greater care is to be had, that the Heat be not too ſtoong, but as equal as may be, and much inferiour to the Moderate heat of an ordinary Chymicall *Balneum*. For 'tis ſcarce Credible how eaſily this unruly Salt will be excited either to make an eſcape at the mouth of the Glaſs, or to break it in pieces. And I remember among ſuch other Accidents which have befallen us in the Preparation of this Odoriferous Salt, that having once ſet ſome of it to ſublime from a perfum'd Chymicall Oyl, though though we adminiſtred ſo gentle a heat, that we thought the Veſſel out of all danger of being broken, or found open: Yet in a ſhort time the fugitive Salt did with a great noiſe blow out the Cork that was waxed to the top of the Veſſel, leaving in the bottom not a limpid Oyl, but a Liquor of a red colour, and a Balſamick Conſiſtence. But if the Glaſs be wide enough to allow theſe fumes competent Roome, and if the heat be warily adminiſtred, the Sublimation may be well enough perform'd.

Of the Medicinall Qualitiy of this Aromaticall Salt, *Pyrophilus*, we have not yet had opportunity to make tryall, but ſome eſteem may be made of them by calling to mind the Vertues of the ſimple Salt of Soot, and conſidering the Nature of the Liquors, from which in this Our Preparation it hath been Sublim'd. The Principall, if not the only thing, that ſeems to be fear'd, is, that the Salt of Soot being it ſelfe hot, and Chymicall Oyles being for the moſt part eminently ſo too, our Salt may prove unfit for Men of Hot and Cholerick Complexions, and in ſuch diſtempers, as proceed from Exceſſe

ceſſe of Heat. But then it may be conſidered in the firſt place, that the Salt of Soot, being of an extreamly apertive, reſolving, and Volatile Nature, and carrying up with it in Sublimation only the more fugitive parts of the Liquor from which it is ſublim'd; It is very likely that the heat produc'd by a Medicine, which by reaſon of its fugacity would ſtay but a very ſhort time in the Body, will not be ſo laſting as that of ordinary Sudorificks, which are nevertheleſſe often adminiſtred with good Succeſs, even in hot Diſeaſes.

Secondly, That there are divers Bodies and Diſtempers, wherein Remedies may be the more proper, for their being ſomewhat hot, and Experience ſhewes, that in Dropſies (to mention now no other Diſeaſes) theſe Volatile Saline Remedies, that ſet the Blood a whirling and powerfully promote its Circulation, may prove very availeable.

Thirdly, The Heat that may be fear'd upon the uſe of our Salt, may be either prevented, or at leaſt moderated by the ſeaſonable uſe of ſuch cooling Remedies, as may be no Enemies to the Operation of this Salt, and yet no friends to the Diſtemper, againſt which it is adminiſtred;

And Laſtly, Suppoſing that the inconveniencies proceeding from this Heat were not to be altogether avoided, yet the advantageous efficacy of ſo powerful and ſearching a Remedy, may very much outweigh that Inconvenience; And therefore *Riverius*, as we formerly told You, commends the Spirit of Soot (though that ſeem at leaſt as hot as the Salt) in Pleuriſies; and in the ſame hot ſickneſſe, we have, as we elſwhere relate, ſucceſsfully adminiſtred the Spirit of Hartshorn, whoſe Qualities are very near of kin to thoſe of Salt of Soot. Other inſtances of this Nature You may meet with diſpers'd in other paſſages of my Chymical Papers, to which I muſt adde, that upon the Conſideration above mention'd,

the Methodists themselves make no difficulty, in Pills and other Medicines, to use the Chymical Oyl, either of Cloves, or of Nutmegs, or even of Cinnamon. And some of our eminentest English Doctors, as I lately noted, have not scrupled of late Years, to use the strong and fetid Chymical Oyles of Amber and of *Guajacum* (and the latter of these in large Doses) whereas in our Preparation, onely the finest and most Aromatick parts of the Oyls, seem to be associated with the fuliginous Salt, since the Oyl remaining after the Sublimation, has been observ'd to be thick and ropy almost like a Syrrup.

But whether or no this Aromatick Salt be a safe Medicine in all Hot Bodies and Diseases, it seems very probable, that it will prove a very powerful Remedy in those Distempers for which it it proper. For first, whereas Spagyrists have with much study, but without much success, endeavour'd to emak Oyls capable of being mixt with other Liquors, by depriving them of their oleaginous form, in which *Helmont* himself complains that they are offensive; we have by our Preparation their finest parts associated with the penetrant and volatile Salt: by whose assistance they are not only fit to communicate their Vertues to Liquors, but assisted to penetrate exceedingly; and perchance also, thereby to obtain such an accesse to the innermost parts of the Body, as is seldome allow'd to Vegetable Medicines. Secondly, We may have by this Preparation one of the most noble and volatile Salts of the World, not onely free'd from its stink, but imbu'd with the Odour, and perhaps divers of the Vertues of what Chymical Oyls we please. And since these Chymical Oyls are by Chymists and Naturalists thought to contain the most noble and active parts of the Vegetables whence they have been destill'd; And since also the Salt of Soot sublim'd from them,

them, carries up with it the fineſt parts of theſe Oyls, why may it not be hop'd, that no ſmall number of diſtinct Remedies may be afforded us by this ſingle Experiment? Theſe Remedies too may be the more acceptable both to Phyſitians and Patients, becauſe they have not in them any thing that is Mineral, and notwithſtanding their great Penetrancy and Efficacy have in them nothing of Corroſive, as many of the Saline Remedies preſcrib'd by Phyſitians in their Diſpenſatories. And thirdly, That the Salt of Soot thus ſublim'd may be alſo enrich'd with the *Sulphur* or Balſamick part of the Spirit of Wine, which was employ'd about its Preparation, may appear probable enough to him, that ſhall examine, by his taſt and otherwiſe, ſuch rectify'd Spirit of Wine as has had a ſufficient quantity of Volatile Salts ſublim'd from it. And how Balſamical a ſubſtance is diffus'd through pure Spirit of Wine, may be gueſſ'd at by the great change which is made in the Cauſtick Salt of Tartar, when it is ſo dulcify'd as to make that Excellent Medicine, which *Helmont* extolls againſt inward Ulcers, and calls *Balſamus Samech*; which if one had the abſtruſe Art of ſo preparing the Salt and Liquor, as to fit them for Conjunction, might be made onely by deſtilling very frequently pure Spirit of Wine from very fine Salt of Tartar. For by this means the fix'd Salt, retaining the Sulphureous Salt or Balſamick parts of the Spirit of Wine, (as may appear by the Aquoſity of the Liquor that comes over the Helm in this Preparation) is thereby ſo depriv'd of its cauſtick taſt, that when it will rob no more Spirit of Wine, but ſuffer it to be drawn off a ſtrong as it was pour'd on, it will eaſily in a moiſt place run *per deliquium*, into a liquor not of a Cauſtick, but Balſamick (and as it ſeem'd to us a pleaſant) Taſt.

And whereas, *Pyrophilus*, we have complain'd of the Difficulty we have met with, to manage the unruly Salt of Soot, and keep it from breaking Prison, we must, to make this Experiment be more practicable and useful, advertise You, that You may, if You please, instead of Salt of Soot Aromatize that of Harts-horn, or mans Blood. And I might adde, that a very ingenious Friend of Ours Dr *N-N.* has lately Practis'd yet a more easie and preferable way of preparing Medicines of this Nature: But though I have partly try'd his Method, and found it to succeed well enough; yet since I had it but by communication from him, and that he makes a considerable Advantage of it, I must forbear imparting it to You, 'till I shall have obtain'd his Consent to disclose it.

I know not, *Pyrophilus*, whether I shall need to adde, That of these fetid Remedies, which are Volatile, and somewhat Sulphureous, as I chose to mention to You but a few, to comply with my present hast, which would not allow me to insist on many; so in what I have deliver'd concerning these few, I have set down Particulars the more fully and explicitly, because I find the Doctrine of Volatile Salts (though in my poor judgment worthy of a serious Enquiry) perfunctorily, and indistinctly enough handled by the Chymical Writers I have yet met with, which made me the willinger to contribute the few Observations I could readily find of those I have had opportunity to make about them, towards the Illustration of so important a Subject, of which having elsewhere spoken in relation to Physiologie (as these fugitive Bodies belong to the Commonwealth of Salts) I thought it might not be unacceptable to You, if I also consider'd them a while in relation to Physick, and presented You with some hints concerning their Medical Uses.

To

[*To the 166th Page, where the Author promises a Declaration, how he would have his Praises of Medicines understood.*]

AND now, *Pyrophilus*, having finished what I thought fit to adde (at present) in the past APPENDIX; I should likewise put at end to the present Exercise of your Patience, but that this being my first Treatise written to You concerning Medical Matters, and not being likely to be the last which you will meet with among the Papers design'd You, I think it requisite, and not unseasonable to declare to you here once for all, with what Eyes I desire you should look upon what I have writtten, and shall write to you concerning matters of that Nature. And first, I must advertise You that I am not so much a Mountebank as to recommend to you the Remedies I mention as certain Cures in the Cases wherein they are proper. For he must have been extraordinarily happy, or very much unacquainted with the Practise of Physick, that has not found, that even those Medicines which are most celebrated by the best Authors, both Galenical and Chymical, do sometimes prove ineffectual as well as often prosperous, and the Remedy prescribed by the same Physitian to twenty Patients sick of the same Disease, has more then once been Observed, though it have succeeded in nineteen, to fail in the twentieth. And indeed the Causes of Diseases, the Constitution of Patients, and the Complications of Distempers are so very various, intricate, and obscure, that it is extreamly difficult even for the most knowing and experienc'd Physitian to make an accurate, and constant Experiment in the Therapeutical part of Physick; and consequently such Experiments are much lesse to be expected from

from Me, whose Condition as well Disabilities forbid me to make the Practise of Physick my businesse, and allow me onely to administer it occasionally, either to my own particular Acquaintance, or to such poor people as are not able to gratify Physitians, or such as I meet with where there are not any: And thereby I am reduced to learn the Vertues of divers of the Remedies I have prepared by very few or none of my own immediate Trials, but the Relation of Physitians, who do me the Favour to administer them for me. And therefore, though I endeavour to put them into the hands of faithfull, as well as ingenious men, Yet not being allowed to be my self a constant eye-witnesse of the Effects they produce, I must here for all these reasons solemnly professe to you, that as I do not set down Medicinal Experiments, with the same positiveness that I do Physiological ones, so I do not intend to venture the repute of being a faithful Relator of Experiments, upon the successe of any Medicinal Receipt or Processe.

Yet in the next place I must tell You, that You would perhaps do Me but right, to think not only that the Chymical preparations of Remedies are, if you understand them aright, candidly set down, though the Vertues ascribed to them do not constantly upon all Trials display themselves; but that I have not rashly and inconsiderately, or upon uncertain Rumors recorded the vertues of particular Remedies, which may be good, though they be not infallible. It being sufficient to make a Medicine deserve the Title of Good, that it be often (in some degree at least) succesful, though now and then it prove not availeable; especially if it be otherwaies so safe and innocent, that even when it proves not prosperous, it weakens not nature, nor is otherwise noxious; And we must not, *Pyrophilus* be so timid as to suffer our seves to be perswaded, that

that if a patient miscarry after the use of the Remedies, the fault must necessarily belong to the exhibited Medicine. For oftentimes Nature will in spight of Remedies make a *Metastasis* of the peccant matter, and so empair the Condition of the patient; and much oftner before death, the Conflict of struggling Nature, and the conquering Disease doth manifest it self in horrid and dreadful Symptomes, which some envious or ignorant Doctors (for the more learned are wont to be more equitable, and lesse partial) injuriously impute to the Chymical Remedy, given before the appearing of those Symptomes, never considering that the like Accidents are wont to attend dangerous Diseases, and dying persons, where Galenicals Remedies onely, and no Chymical ones at all have been administred. And that divers of the most eminent, and Methodical of our Modern Physitians scruple not to use frequently both *Crocus Metallorum*, *Merc. Dulcis*, and some other Chymical Remedies, and to impute the miscarriages of the Patients that use them to their Diseases, though not many years, since all the frightful Symptomes accompanying the dying persons to whom they had been exhibited, were confidently imputed to those Medicines. To which let me adde, *Pyrophilus*, that oftentimes it may be very just to prize an Empirical Remedy more then a Galenical, though the Methodist and the Empirick have each of them by his respective Remedies, performed cures of divers patients in the same Disease; *partly* because Empirical Chymists are seldome resorted to but in desperate cases, or till Nature be almost spent, either by the violence of the Disease, or the unprosperous operation of the Medicines employed to remove it; and *partly*, because the Methodist helps his Remedies by premising the wonted Evacuations (by Vomit, Seige, or by Phlebotomy) by varying them according to Emergent Circumstances,

ſtances, by skilfully and ſeaſonably adminiſtring them, and by ſtrict rules of Diet; whereas the Empirick oftentimes uſeth but a ſingle Remedy, and uſually without premiſing general Evacuations, exhibits it not to the greateſt Advantage in relation to time, and other circumſtances, and is much more indulgent to his patient in point of Diet: So that when an Empirick, and a rational Phyſitian do both in ſeveral patients Cure for inſtance the ſame Pluriſie, the Diſeaſe may be very often judged to have been removed in one of the Patients chiefly by the Phyſitian, and in the other by the Remedy.

In the third place, *Pyrophilus*, I muſt advertiſe You, that though I mention more Chymical remedies then Galenical, yet it is not out of any partial fondneſſe of the former, and much leſſe from any undervaluation of the latter, but *partly*, becauſe Chymical proceſſes being wont to be more unfaithfully, or obſcurely ſet down by Authors then Galenical Receipts, I thought it might ſave You ſome labour to receive from me a frequenter account of thoſe, then theſe; and *partly*, becauſe in many Chymical preparations, divers conſiderable Changes being to be wrought upon the Concretes to be prepared by them, there is oftentime ſo much of Philoſophy to be learn'd by ſuch Proceſſes, that the ſucceſſe of them may prove inſtructive to you, though it ſhould acquaint you with their Truth only, as they are Chymical preparations, and not as they are Medicinal Receipts. But otherwiſe I love to look upon both Chymical and Galenical Remedies, with an impartial eye, and think that neither the former ought to be deſpiſed for the latter, nor the latter for the former; for as Chymical Remedies have commonly the advantages of being more durable, leſſe clogging by their quantity, and leſſe nauſeated by Patients; ſo Galenical Remedies have when they

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are of equal Efficacy, the Advantages of being more cheap, (at leaſt quantity for quantity) more procurable, and ſooner prepared. And ſuch is the variety of Caſes ariſing from the variety of Conſtitutions and Diſtempers, that in ſome of them the former ſort of Remedies may be more proper; and in others, the latter may ſeem requiſite; and in ſome alſo both ſorts may alternately be ſo uſeful, that neither of them can well be ſpared.

In the fourth place, *Pyrophilus*, let me advertiſe You, that divers Chymical Remedies, and ſome Specificks alſo which are not Chymical, have ſeem'd upon triall leſſe effectual then indeed they are, becauſe they have been tryed by ſuch Phyſitians as weaken their Efficacy by not adminiſtring them as they ſhould. For ſome Phyſitians will never exhibite a Chymical Remedie, till the Patients ſtrength hath been almoſt tired, if not quite ſpent with the unproſperous uſe of divers other clogging and debilitating Medicines. Others are ſo diffident of Chymical Remedies that they never dare to exhibite them in a full Doſe, nor by themſelves, but will blend a ſmall quantity of a Chymical Medicine or a Specifick with other Ingredients, which either conſtitute with it a Medicine of new qualities reſulting from that mixture, or at leaſt much clog or enervate the activity and vertue of the Chymical or Specifick Ingredients: by which, even in ſo inconſiderable a Doſe, theſe diſtruſtful Doctors dare yet require that great matters ſhould be performed. Of which injurious way of adminiſtring the Remedies I recommend to you *Pyrophilus*, I do not cauſeleſly deſire you to beware; as I may hereafter have occaſion to ſhew you by particular inſtances of the Reaſonableneſſe as well of this Advertiſement as of the others which I either have given You, or ſhall give you in this and other Papers. And another ſort of Phyſitians there is

who are of so despondent and rather partial an Humour, that if a Chymical Remedie or a Specifick do not presently perform the hop'd-for Cure, though they find that even upon their disadvantageous manner of administring it, it doth good; yet they will quickly desist from the Use of it: And because it doth not do Wonders, they will not scruple to affirm that they have tried it and found it do nothing; whereas they are wont to continue their own Courses of Physick without discouragement, though it be usually some weeks before the Patient find any good by them, and oftentimes (as numbers of the printed Observations of Physitians as well as daily Experience testify) the patient is by the tedious Course of Physick he has gone through very little better'd, if not much impair'd. Which I speak, *Pyrophilus*, not with an Intention to disparage Physitians in general, the most learned and ingenious of them being free enough from the Partiality I here take notice of, but to keep good Remedies from being disparaged by the envious or unskilful trials of bad Administers: And though indeed some Chymists are so vain-glorious or unwary, as to promise that the Operation of their Remedies should be as well suddain, as effectual; yet if the Medicines themselves be found availeable, although not swiftly so, that slowness ought to make us but condemne the Boastings of the man, not reject the use of the Remedies.

And in the last place, *Pyrophilus*, I must Advertise you, not to expect that every one of the Remedies I commend should be Physick and Physitian too; I mean, that it should of it self suffice to performe the Cures of those Diseases against which it is commended. For Medicines are but Instruments in the hand of the Physitian, and though they be never so well edg'd and temper'd require a skilful hand to mannage them; and therefore I cannot but admire and disapprove their

boldnesse

boldneſſe that venture upon the Practiſe of Phyſick, wherein it is ſo dangerous to commit Errours, barely upon the confidence of having good Receipts. For though by Converſation with eminent Phyſitians I have found the learnedeſt of them to diſagree ſo much about the Nature and cauſes of Diſeaſes, that I dare not deny but that he may proſperouſly practiſe Phyſick that either ignores or diſſents from the received Doctrines of the Schooles concerning the cauſes of Diſeaſes, and ſome other Pathological particulars; yet I cannot but diſlike their boldneſſe who venture to give active Phyſick, either in intricate or acute Diſeaſes without at leaſt a Mediocrity of knowledg in Anatomy, and ſo much knowledg of the Hiſtory of Diſeaſes, as may ſuffice to inform them in a competent meaſure what are the uſual Symptomes of ſuch a Diſeaſe, what courſe nature is wont to take in dealing with the peccant matter, and what diſcernable alterations in the Patients Body do commonly forerun, and thereby foretel, a *Criſis*, or otherwiſe the good or bad event of the Diſeaſe: To all which is to be added ſome tolerable meaſure of Knowledg, not only of the *Materia Medica*, and the chief waies of compounding ſeveral ingredients into Medicines of ſeveral Formes and Conſiſtencies, as circumſtances may require; but alſo of the orderly and ſeaſonable adminiſtration of the helps affordable by them. Theſe particulars, *Pyrophilus*, might eaſily be enlarged on, but having neither the leiſure nor deſigne to handle them commonplace-like, I ſhall only give you this account of my requiring in the Profeſſ'd Practiſer of Phyſick ſome knowledg both of the *Materia medica* and the Method of compounding and adminiſtring Remedies, that (excepting perhaps the *Arcana majora* as Chymiſts call them) even the beſt Medicines by being unſeaſonably or prepoſterouſly adminiſtred, eſpecially in acute Diſeaſes

where Nature's motions are to be diligently watcht, and seconded, may do a patient as much harm as the orderly and skilful administration of them can do him good. And that he that has nothing but one good receipt for a Distemper, and knowes not how to vary it by adding, omitting, or substituting other parts of the *Materia Medica*, as urgent occasion shall require, may oftentimes find himself reduced either to suffer his Patient to languish helpless, or to venture by curing him of one Disease to cast him into another. For sometimes the Patients constitution makes the Medicine prescribed by the Receipt unfit to be administred; and sometimes too, the Disease for which the Receipt is proper, is in the Patient complicated with some other Distemper which may be as much encreased by the Specifick, as the other Disease may be lessned. I know for instance some eminent men that are wont to Cure very stubborn Venereal distempers, by a Chymical preparation (which some of themselves have been pleased to disclose to me) of the *Indian* Plants, *Sarsaparilla*, *Guaiacum*, *&c.* But if these men met with Patients, such as those which *Eustachius Rudius* mentions himself to have often met with, who upon the use of the least quantity of *Guaiacum*, though corrected with cold ingredients, were wont to be presently affected with such sharpness of Urine, and Inflammation of the parts, to which Urine relates, as hazarded their lives; they would be reduced, as well as our Author confesseth himself to have been, to have recourse to *Mercurial* or other Remedies. To which we may adde, that the use of *Sarsaparilla*, and *Guajacum* is generally forbidden by the warier sort of Physitians, in those Patients, whose Venerial Distempers are complicated with heat or Inflammation of the Kidnies or Livers. And sometimes also it happens, that the very outward forme of the Medicine prescribed by the Receipt is not fit,

or

or perhaps possible to be administred. For not to mention that divers Patients can retain no purgative Physick exhibited in the form of a Potion; and some others are as apt to Vomit up whatever is given them in the form of Pills, not to insist on this I say, I shall content my self to relate to You a memorable Case that hapned a while since to a Physitian of my acquaintance. He was called to a lusty young Woman, who upon an accidental but violent Cold was suddenly taken with such a Constriction of the Parts inservient to Speech and Deglutition, as made her altogether unable either to speak or swallow any thing at all; and having thus continued some daies in spight of Glysters or other Remedies prescribed by a very Learned Physitian, and in spight of Endeavours to excite Vomiting, by making Her hold emetick things in her Mouth; the poor Woman was in great danger (when my acquaintance came to her) of perishing for hunger: what in this case could be expected from the best Remedies that must necessarily be taken in at the Mouth? Wherefore the Physitian finding her yet strong enough, and without Feaver, and yet her case almost desperate, did as judiciously as luckily prescribe a Glyster, wherein to ordinary Ingredients were added (as himself a very few daies after told me) about four *ounces* of the Infusion of *Crocus Metallorum*, with an advise that it should be kept in as long as possibly She could, and by this Medicine, Nature being sufficiently irritated, there quickly followed upon it some violent Vomitings, and upon them a liberty both of Swallowing and Speaking. [And since this a young Gentleman and Fellow-traveller of mine, had the Organs of deglutition so strangely weakned without any manifest cause, that though he were able to make me a Visit, and acquaint me with his Case, yet he was very apprehensive, he should in a very few Dayes be starv'd, and being unable to swallow

Remedies,

Remedies, had quickly periſh'd in deſpight of the *Arcana Majora* themſelves, had he been maſter but of ſuch of them as (like thoſe wont to be magnify'd by Chymiſts) muſt be taken into the Body; if a very happy Phyſitian to whom I directed him, had not by a very Efficacious and Specifick Medicine externally to be apply'd, ſeaſonably reſcued him from ſo unuſual and deſperate a Caſe.] But, *Pyrophilus*, as I would not upon the ſcore of good Receipts have the Phyſitians skill deſpis'd, or thought uſeleſſe; ſo I wiſh that the Phyſitians skill may not make him deſpiſe good Receipts; For we have often ſeen (eſpecially in outward affections) not onely Empericks and Chirurgeons, but even Ladies and old Wives, with a lucky compoſition preſcribed by a Receipt, performe more conſtant and eaſie Cures of the particular Diſtemper, for which that Receipt is proper, then even Learned Phyſitians by their extemporary, though pompous and Artificial Preſcriptions. And the illuſtrious Lord *Verulam* (one of the moſt judicious Naturaliſts that our Age can boaſt,) thinks fit to take notice of it as a Deficiency that Receipts by long Experience approved, are not more cloſely, and as he ſpeaks *religiouſly adher'd* to, but alter'd upon every light occaſion; And in the ſame Chapter to anſwer the Principal, as well as the moſt obvious Objection in this Matter, "That, ſayes He, any man "induc'd by ſome Specious Reaſon ſhould be of opinion, that "it is the part of a Learned Phyſitian (reſpecting the Com- "plexions of Patients, their Age, the ſeaſon of the Year, Cu- "ſtome, and the like) rather to accommodate his Medicines "as Occaſions ſuggeſts, then to inſiſt upon ſome certain Pre- "ſcripts is a deceivable Aſſertion, & which attributes too little "to Experience, too much to Judgment. And a little above He goes much farther then we pretend to do, for ſpeaking of the Neglect of the uſe of particular Receipts, which, as He

De Augment. Scient. Lib. 4. cap. 2.

He ſpeaks, by a kind of propriety, reſpect the Cure of particular Diſeaſes, He addes, (ſeverely enough,) "That the Phy-"ſitians have fruſtrated and taken away the fruit of Traditions, "and approved Experience by their *Magiſtralities*, in adding "and taking out, and changing Ingredients of Receipts at their "pleaſure, and almoſt after the manner of Apothecaries, put-"ting in *Quid pro quo*, commanding ſo preſumptuouſly over "the Medicine, as the Medicine can no longer command the Diſeaſe. Thus farre our Judicious Author: But I will rather chooſe to expreſſe to You my ſenſe on This whole Subject of Receipts, in the Words of that Experienc'd Phyſitian to three Emperors, *Johannes Crato*: *De morbi Natura* (ſayes He) *cauſa, locóque affecto Medicus diligenter cogitet, atque in eo plus quam in certis medicamentorum mirificis formis ſitum putet: Medicinam tamen expertam cum ratione adhibitam plus valere quam ea quæ interdum ſubitò à Doctiſſimo etiam Medico magnâ ratione exhibita excogitatur, non dubito: Atque hac in parte Rationales etiam Medicos Empeiricis cedere debere de ſententia Hippocratis ſtatuo.* Onely I muſt adde by way of Explanation, That this Sentence is to be underſtood to expreſſe my ſenſe, when the Medicines uſed are not very extraordinary, but ſuch as *Crato* employ'd, and has left us in his Writings: for there may poſſibly be ſuch effectual Specificks, and ſuch powerful and commanding Remedies, that the Efficacy of the Medicine may (at leaſt in ſome particular Diſeaſes) excuſe and repair much want of skill in the Preſcriber. *Conſil.* 322.

If the Teſtimony of *Helmont* concerning the *Arcana* of *Paracelſus* be conſiderable, even in a Tract (where either out of Emulation or Judgment, he endeavours ſomewhat do depreciate both them and their Author) much greater things might be boldly affirmed of ſome *Arcana*; for *Fateor Lubens*, (ſaies he, ſpeaking of *Paracelſus*) *Me ex ejus ſcriptis profeciſſe multum*, *Helmont. in Arcan. Paracelſ. pag.* 787.

multum, illúmque potuisse, per Remedia ad unitatis Symbolum adsendentia, sanare Lepram, Asthma, Tabem, Paralysin, Epilepsiam, Calculum, Hydropem, Podagram, Cancrum, atque ejusmodi vulgo incurabiles morbos : attamen Paracelsum fuisse ignarum radicis vitæ longæ, tam ex ejus scriptis & medicaminibus quam ex Obitu collegi, &c. And in the same Tract just before He comes to enumerate *Paracelsus*'s Arcana. *Concedo*, saith he, *Universales aliquot Medicinas, quæ sub unisono Naturæ longe gratissimo, insensibiliter post se vinctum educunt hostem, cum egregia Organorum depuratione, Concedo pariter appropriatas aliquot quo universalis amplitudinem in specificis morborum directionibus æmulantur.* And among those *Arcana* themselves that is ranck'd but in the second place, of which he gives this Characters: *Sequitur dein Mercurius Vitæ, Stibii proles integri, quæ omnem morbi nervum penitus absorbet.*

Helmont. in Arcan. Paracels. pag. in 790.

And because another *Arcanum* does not so powerfully renovate, as that last mention'd, and two more; He allowes to those three others the precedencies of that whereof He yet saith: *Quarto loco est Mercurius Diaphoreticus, melle dulcior & ad ignem fixus, solis Horizontis omnes proprietates habet: perficit enim quicquid Medicus & Chirurgus possint optare sanendo.* But because, that any Medicines should be qualify'd to deserve such superlative Encomiums, may seem a thing fitter to be wish'd then credited, I would not disswade You till the Chymists Cures have made good their Masters brags, to be altogether of our Authors Mind, who somewhere professes: *Se morbum non dinguere, si Remediis* (sure he speaks of such Remedies as he thought he had) *sit summa bonitas.* But yet you may perchance ascribe much more even to Remedies far inferiour to the *Arcana Majora*, in the cases wherein they are most proper, then many are willing to believe. Insomuch that I have sometimes observ'd with wonder, that an

Excellent

Excellent Person (whom I need not name to You) cures the Rickets generally in Children of several Ages and Complexions without having hitherto fail'd (as she professes) in any one, by prescribing no other Remedy then the single use of the above describ'd *Colcotharine Flowres*, which I presented Her; and which a couple of Physitians also, to whom I recommended them, tell Me, They have try'd in the same Disease with the like success, as this Lady hath hitherto met with. And I remember that eminently Learned and experienc'd Physitian Dr *G. Boat*, (of whose skill both your Excellent Mother and You have had good Proof) solemnly assur'd me, as I elswhere also note, That he knew a Physitian who constantly cur'd within two or three Fits all Agues, whether recent or radicated, in Persons of all Ages, Sexes, and Complexions, indiscriminately with one single outward Application to the Patients Wrists; but that this Envious Doctor would never part with it to our Friend, or any else, no not upon his Death-bed: onely Dr *Boat* discovered, That Spiders or something comming from them were main Ingredients of his *Pericarpia*.

And indeed there are certain Preparations and Compositions of Remedies so lucky, and whose Successe doth so much exceed Expectation, and the Efficacy of common Compositions; that the same Physitian, whose they are, may upon several Occasions prescribe an Hundred others, each of which he may think as rational as any of those, which nevertheless shall be all of them much inferiour thereunto. And therefore I wonder not that the most Learned of the Methodists themselves have much valued and celebrated some peculiar Processes and Receipts, as here amongst us (to mention no others) the Famous Sr *Theodore Mayerne*, was wont almost in all Obstructions, Cachexies, and Hydropicall Distempers to magnifie and use that peculiar Salt of Steel of his,

which he was pleas'd to call *Anima hepatis.*

And to these Domestick Instances (which I might easily accumulate) of the esteem eminent Physitians have made of Receipts, I might adde very many Forreign ones. Nay *Galen* himself, who has so copiously treated of the *Materia medica*, and the *Composition of Medicaments*, though he were sufficiently expert at drawing up Receipts, doth yet in his Book *De Compositione Medicamentorum*, and elsewhere transcribe, and sometimes commend (and mention his having us'd) divers of the Compositions of Auncienter Physitians, and especially magnifies *Andromachus* His Treacle.

I might, *Pyroph:* here mind You, That we see that Chymistry, as Incompleat as it yet is, has been able so much to improve the preparations of Remedies, as to afford us some, which are so Innocent as well as Efficacious, that in the Diseases they principally respect, they require not, as of Necessity, neer so much of Theorical skill, as others do in the Administer; I might likewise take notice, That Experience also teacheth, especially by what we see perform'd by the *Spaa*, and some other Mineral Waters, that one Medicine *may* be so richly endow'd, as to be more Effectual against several differing Diseases, then even the better sort of other Remedies against any one particular Disease.

I might further represent as some thing that makes yet more to my present purpose, that though every Body can advise his sick Friends to an Air that is famously healthful, if there be any within a convenient Distance from them; Yet there are some Aires so eminently good, and that not upon the Account of any one Predominant Quality that makes them opposite to a Disease springing from its contrary, but from a hidden Temperature, or certain friendly *Effluvia*, that they alone often cure Variety of Diseases in Persons of

of differing Ages and Complexions: as Navigators obſerve in the Iſle of St *Helen* where the *Spaniards* and ſome other *Europæans* in their paſſage to the *Indies*, often leave without Phyſitians great numbers of Sick, whom they find for the moſt part recover'd at their return. And that ſometimes ev'n the acuteſt Diſeaſes may by the Sanative Steams that inrich the Air be cur'd almoſt in a trice is aſſur'd by thoſe that have liv'd in grand *Cairo*, who have affirm'd to me, what the Learned *Proſper Alpinus*, who ſo long practis'd Phyſick there, aſſures Us, That upon *Nilus*'s beginning to over-flow, though in the Heat of Summer, there enſueth a ſuddain Recovery of thoſe multitudes of Perſons of differing Ages, Temperatures, Sexes, *&c.* which there happen at that time to ly Sick of the Plague. Theſe things I ſay, *Pyrophilus*, and more I might adde, to what You may find diſpers'd here and there in the ESSAYES which this Paper acccompanies towards the inferring that we ſhould not haſtily conclude it *Impoſſible* that there May be found ſuch Medicines as may be more then particular and Specifick Remedies without requiring the Giver be a great Phyſitian. But to draw at length to a Concluſion, I ſhall rather Summe up my preſent thoughts of this Matter Thus.

Ordinary Receipts without an Ordinary Meaſure of skill in Phyſick are not raſhly to be rely'd on, eſpecially in Acute Diſeaſes; where by giving Medicines otherwiſe innocent enough, to looſe the opportunities of adminiſtring proper ones may be very prejudicial, and where ſometimes the ſeveral ſeaſons of the Diſeaſe do require ſuch differing Remedies if they be but Ordinary ones, that a Medicine proper enough for the Diſeaſe at one ſeaſon of it may do Miſchief at another: But if indeed there be Noble and Extraordinary *Arcana*, that work rather by ſtrengthning and reſtoring Nature, and Reſolving,

ſolving, or otherwiſe deſtroying the peccant Matter they find any where in the Body, then by irritating and weakening Nature or putting Her as it were to a troubleſome Plunge; the uſe of ſuch Remedies may deſerve to be a little otherwiſe conſider'd, as that which may not Ordinarily (for I ſay not Ever) require more Inſtruction then may be afforded to Perſons not Indiſcreet by ſuch Directions and Cautions as may be Divulg'd, or otherwiſe Communicated, together with the Remedies themſelves: As we ſometimes ſee that by the help of ſuch Inſtructions unlearned Perſons and ev'n old Wives do with ſome one Soveraign Plaiſter, Balſam, or other outward Remedy, Cure many and various Tumors, Ulcers, and other Sores in Perſons of differing Sexes, Ages, and Complexions. And becauſe You will eaſily grant that this Example does farre leſſe accomodate our preſent purpoſe then does the Caſe it ſelf, as I juſt now put it, I hope You will allow me to repreſent further, That at leaſt it ſeems not ſo Rational to judge of all the Remedies that Art improving Nature can afford us by thoſe that are hitherto in Uſe either among Methodiſts or Vulgar Chymiſts, but rather to think that the Nobleneſs of Remedies will be advanc'd according as the Art of preparing them ſhall be promoted; and that it tis not ſo ſafe and eaſy, poſitively to determine the Efficacy of the former, otherwiſe then in Proportion to the Diſcoveries we have attain'd to in the Latter.

The End of the APPENDIX.

The

The CITATIONS *Engliſh't.*

AD *Pag. 6. In Corpore* &c. But I dare not try thoſe things upon Humane Body, which have not been before try'd upon former Experiences, For the End of ſuch raſh Experiments may be the ruin of all Lives.

Ad Pag. 9. Naturalium &c. This is the Courſe of Naturaliſts and Phyſitians who proſecute their Art Philoſophically, The Naturaliſt ends where Medicine begins, and Medicine begins where the Naturaliſt endeth.

Ad Pag. 11. Sunt enim &c. The parts of Humane Body are unknown, and therefore we ought to conſider them by the parts of other Animals to which they are like.

Ad pag. 19. Hoc in &c. This I have more then once Obſerv'd in *Lizards* which I kept in my own Houſe. For my Children being at play, when with a Rod they had ſtrook off the *Lizards* Tails I ſaw them within a day or two come out to Feed, and their Tayles then by little and little ſtill encreaſing and growing bigger.

Ad pag. 73. Neque &c. Nor may we be ignorant that in acute *D*iſeaſes the Notes of Life or *D*eath are more fallacious.

Ad pag. 75. Quidam &c. One who before he fell into the French *P*ox was blind of a Cataract in one of his Eyes, by being anointed with Quickſilver, was recover'd, not only from the cheif *D*iſeaſe, but (which was moſt ſtrange) from his Cataract.

Cataract. Nor is it irrational that Cataracts should be dissolv'd by such anointing; when Experience teacheth, That hard Tumors clogg'd together of pituitous Matter are powerfully dissolved by Mercurial Inunctions.

Ad pag. 78. *Ejusque* &c. And they urge many Instances of it even to my admiration.

Ibid. *Ajunt* &c. Yet they say that the Seed of the *Calchoos*, ground and taken in any proper Water doth dissolve the stone into a very Durt, which being voided doth harden again into a stony substance. I saw a Young Man to whom (upon my knowledg) this accident befell. When he was tormented with the Stone in the Bladder, which I understood both by the Lithotomist who felt it, and by the Symptomes which he suffered: I sent him to a Fountain, which takes its name from St *Peter* when he had staid there two Moneths he return'd Free from the Stone, and brought home with him all the Durt which he had voided by degrees, in a Paper, coagulated as it were into fragments of Stone.

Ad pag. 85. *Hic* &c. He loaths nothing that stinks, or is otherwise unpleasant, He hath been often seen to chew and swallow Glasse, Stones, Wood, Bones, the Feet of Hares, and other Animals, together with the Hair, Linnen and Woollen cloath, Fishes and other Animals alive, Nay, even Mettals, and Dishes, and Globes of Tin. Besides, which he devours Sweet, and Tallow Candels, the Shels of Cockles, and the Dungs of Animals, especially of Oxen, even Hot, assoon as it is voided. He drinks the Urin of others mixt with wine or Beer: He eats Hay, Straw, Stubble, and lately he swallow'd down two living Mice, which for half an Hour continued biteing at the bottome of his Stomack; and to be short, Whatsoever is offer'd him by any Noble Persons, it goes down with him without more adoe upon the smallest reward, insomuch that within

within a few Daies he hath promiſed to eat a whole Calfe Raw, together with the Skin and Hair; Among divers others I my ſelf am a Witneſſe of the Truth of theſe *&c.*

Ad pag. 86. *Cauſam* &c. To find in the Carcas the cauſe of this Vocacity will be queſtionleſſe very difficult: Some one perchance would referre it to that which *Columbus* obſerv'd in the Carkaſſe of *Lazarus* the Glaſſe-eater, and reſolve that the fourth conjugation of Nerves which nature ordain'd for taſting, come neither to the Palate nor the Tongue: But ſo there would onely be rendred the cauſe of his want of Taſt, and not why he ſhould be able to take ſuch uncouth things without offence to his Stomach and digeſt them, which without doubt ought to be the particular and ſingular conſtitution of his Stomach and Guts, which yet may not appear to the Eye by the Effects.

Ad pag. 91. *De Laudano* &c. Of his *Laudanum* (that Name he gave to little Pills, which in the extremity of Diſeaſes he adminiſtred as a moſt Divine Medicine allwaies giving them in an odde Number) he ſcrupled not to affirm that by that Medicine he could put life into thoſe who were as good as Dead; and that while I was with him he made good in ſome Experiments.

Ad pag. 94. *Oportet ubi* &c. Where a Medicine anſwers not we ought not ſo much to eſteem the Author as the Patient, and to try ſomewhat farther and farther.

Ad Pag. 97. *Idem fit* &c. The ſame is made of *Mandioca*, Potato's, Turkiſh Mullet, Rice, and other things which being chew'd by old Women, and Spit together with much Spittle, This Liquor is ſtrait put up into Veſſels, and there kept until it ferments and caſt down a Sediment.

Ad pag. 103. *Hoc eſt* &c. This *Birchwater* hath a ſweet Sharpneſſe and very pleaſant Taſt, it allaies Thirſt, and the drineſſe

drineſſe of the Entrails; It tempers the Heat of the Blood; It opens Obſtructions and drives out the Stone.

Ad pag. 111. *Conficiunt* &c. They make Drink of that *Mulli* rubbing it gently in their hands in Hot-Water, until they have rubb'd out all the Sweetneſſe; they ſtrain that Water, and keep it three or four Daies, until it ſettle, and then it becomes a very clear Drink: The ſame Water boil'd turns into good Hony.—Of this Fruit boil'd with Water according to different Manners is made Wine, or good Drink, or Vinegar, or Hony.

Ad pag. 112. *Porro.* Then by cutting the Shoot with a Razor-blade made of a Flint, there runs out of the Cut a certain Liquor in ſuch a quantity that (which is wonderful) out of one ſingle Plant, ſometimes Fiftie or more *Arobæ* run out: From which Liquor there is made Wine, Vineger, Hony, and Sugar. For the Liquor Sweet of it ſelf, is by being boil'd made much ſweeter and thicker, ſo that it is at length kernes into Hony.

Ad 113. *Semel* &c. If once in a Moneth one eat or Drink to exceſſe, the Day following, if he be weigh'd (though he hath ſuffred no ſenſible Evacuation) Yet then he will weigh lighter then is Uſual. A conſtant Diet wants the help of thoſe that once or twice in a Moneth do exceed: For the Expulſive Faculty being oppreſſ'd by too great Repletion ſtirr's up ſo much of perſpiration, as vvithout the Staticks no one would believe.

Ad pag. 123. *In urbe* &c. In the Citty St *James's* that is in the Province of Chyle, certain Captive *Indians* cut off the Calves of their Legs, and for hunger eat them, and (which is ſtrange) applying the leaves of a certain Plant to their Wounds immediatly they ſtanch the Blood.

Adde

Adde *pag.* 124. *Memini* &c. I remember that the Limbs of Souldiers wounded with Gunshot, to have been cut off by the advice of our *European* Surgeons, both *Dutch* and *Portugall*; those Barbarous people by recent juices Gums and Balsams to have freed them from Knife and Cauteryes and happily cured them. I also am an Eye witnesse, that which the juyce of Tobacco alone they have cured Wounds given over by our Surgeons.

Adde *pag.* 131. *Experimentis* &c. It is approv'd by many Experiments, that its Vertues are excellent against the Plague, Malignant Feavers, the bitings of Venemous Creatures, the *Diarrhæa* and other Fluxes.

Adde *pag.* 135. *Nam Venena noluit* &c. He made not *Venome* to be our Poison, for neither made he Death nor any Deletery Medicament upon the Earth, but so, that by a slight industry and endeavour of our own they might be turn'd into great pledges of his love, for the Use of Men against the cruelty of Diseases which were in processe of time to arise. For in those Vemomes is the help that more benigne and familiar simples cannot yield, and those most frightful Poisons are yet preserv'd in Nature for the more great and Heroick uses of Physitians.

Adde *pag.* 136. That the *Lapis Cancrorum* resolv'd into the forme of its first Milk affords an Antidote against the violence of many Vegetables that are infamous for their being over laxative.

Adde *pag.* 150. *Mille* &c. Our Court hath try'd the Efficacy of this Salt in a thousand Experiments in the Diseases of Melancholly, in all Feavers, continuous and intermittent, in the Stone, Scurvy *&c.* Nay more we have observ'd more then once that it hath procured sleep, especially in persons

Melancholly, The *D*oſe is from one, to two Scruples, we uſe divers pounds of it in a Year.

Adde *pag.* 150, 151. *Cæterum quantum* &c. But for the exceeding and portentous Vertues of the Bezar-ſtone, I have found by a thouſand trials that they are not ſo very great.

Ib. Nil porro &c. I ſpeak no more of theſe Stones, leaſt I ſhould ſeem by my Commendation of their Vertues to provoke Lithotomiſts to make diſſections at any rate. This I have moſt certainly Experienc'd, That the Stone found in Mans bladder doth well provoke Urine and Sweat. And particularly in the time of that Plague, which in the Years 1624 and 1625 miſerably vexed Ours, and all other the Citties of *Holland*, for want of the Bezar-ſtone, I remember, I preſcribed this and found it, (let me tell You) a more great and excellent Sudorifick.

Adde *pag.* 159. *Credo* &c. I believe Simples in their own ſimplicity are ſufficient for the Curing of all Diſeaſes.

Adde *pag.* 19. *Quod* &c. But if You come not to that *Arcanum* of *Pyrotechny*, learn at leaſt to make the Salt of Tartar Volatile, that by means of it You may perfect Your Solutions. Which though it leave thoſe things which it diſſolveth equally Homogeneous, being digeſted in Us; Yet it borroweth ſome of their Vertues which it carrieth along with it ſelf to overcome Diſeaſes.

Adde *pag.* 199. *Dicam* &c. I will ſpeak it for their ſakes, who are ingenious that the Spirit of Salt of Tartar, if it diſſolveth Unicorns Horn, Silver, Quickſilver, Crabbes Eyes, or other like Simples, it will Cure not onely Feavers but other Diſeaſes in great abundance.

Ib. Mirum &c. It is a wonder what the very Salt of Tartar alone being made Volatile will performe, for it cleanſes the Veins of all the feculencies and the cauſers of Contumacious

macious Obstructions, and doth disperse the congregated Matter of Apostems. Of this Spirit of the Salt (and not of the Oyl) is that saying of *Paracelsus* true. That whether this Medicine cannot reach, there is scarce any other more powerful that shall reach it.

Ad pag. 201. *Ars* &c. Art is Long, Life is short. But where the End is by gift, there Art is short, and Mans Life long, if it be compared to Art. Therefore *Hippocrates* had reason to make the complaint, for it even happen'd to his followers according to his Words. The Art of Medicine consists in Philosophy, Astronomy, Chymistry, and Physicks, and therefore it may truely be said that the Art is long. For there is much time required, throughly to learn and search these fower Pillars of Medicine.

Ad pag. 202. *Est enim* &c. For this Art is conjectural, and not onely Conjecture, but Experience it self doth not allwaies answer.

Ib. Ἡ δὲ πεῖρα *&c.* Experience is Uncertain, and Fallacious Judgment is difficult to be made.

Ib. Hoc modo &c. And this was the fashion of Medicine in the beginning, that it had no Theory, onely Experience, that such a thing was Laxative, such a thing Astringent: But how, or why they were so that was not found out, and therefore one was heal'd another perish't: but now *&c.*

Ib. P*er rationem* &c. By Reason it is not easy in a Disease to give Judgment, but is as difficult as any thing imaginable.

Ib. Neque, &c. For if the truth were easie to be found, so many and so excellent men as have made it their business to find it, had never been divided into so many Sects and Opinions.

Ad pag 203. *Non titulus* &c. It is not a Title, nor Eloquence Nor Skill in the tongues, nor the Reading of many books (though these are Ornaments) which are to be considered in a

but a prime knowledg of Matters and Myſteryes which alone may ſtand in the ſteed of all the reſt; It is the part of a Rhetorician to ſpeak eloquently, to be able to perſwade and to draw the Judg to his own party. It is the part of a Phyſitian to know the ſeveral ſorts of Diſeaſes, their Cauſes and Symptomes, and then which skill and induſtry to apply Medicines and to make Cures of them all, according to their ſeveral Natures and Faſhions.

*Adde pag.*207. *Imo* &c. Nay, I ſaw divers, as it was in an inſtant, redeem'd from death who had been poiſon'd by the eating of Venomous Muſhrooms and other unwholſome things, onely by drinking a Recent Infuſion of the Root *Jaborand*, whileſt my ſelf and other of *Galens* Diſciples bluſh't to ſee the ineffectual endeavours of all our *Alexipharmaca*, Treacles and other Antidotes: So that afterwards I ſuffred my ſelf to be joyn'd in Conſultation with thoſe barbarous Collegues, not ſo much to be *arbiters* of the condition of our men by their Pulſe, as to give their aſſiſtance and Councel in the forementionʼd way (*viz.*) the preſcribing of proper Medicines.

*Ad pag.*208. *Hujus* &c. The Vertue of this Stone is much above that of any other gems, for it ſtops the Flux of Blood in any part. —When the Women perceive a fit of the Mother coming upon them, by applying this Stone they are immediately eaſed, and if they allwaies weare it, they are never troubled with thoſe Fits more. Of this they make faith, by many Inſtances.

Ib. Vidimus &c. We have ſeen ſome that were troubled with the Flux of the *Hæmorrhoides* who found Remedy by wearing Rings made of that Stone continually on their Fingers, and the Monthly Flux is ſtai'd by the ſame way.

Ad pag. 209. *Prægnantibus* &c. This Stone is not proper for thoſe who are with Child, for it is ſo ſure to cauſe Abortion.

tion that the Women of *Malaica* told me, that if at any time their Monethly Evacuations were obstructed, that if they only carried this Stone in their hands they found Remedy thereby.

Ad. pag. 210. *Hoc loco* &c. In this place I cannot but relate the admirable Vertues of our *Electrum* which I have observ'd with my own Eyes, and therefore can attest with a good conscience. For we saw Rings of it which he that wore neither felt Cramp, no Palsy, nor other pain. He was subject to no Fits of Apoplexy, nor Epilepsy, insomuch that if one of these Rings were put upon the Ring Finger of a person actually in any vehement Fit of the Falling sickness, the Fit would immediately assuage, and the person as soon come to himself.

Ad 225. In the Citty *Posto* where I liv'd certain Years, a certain Indian cured all sorts of Diseases by the juice of one Plant alone, wherewith he anointed the Limbs and any other part particularly affected, and then covering them warm with Blankets provoked Sweat. The Sweat that came from the parts so dawbed was meer Blood which he wiped off with Linnen Clothes, and so he proceeded until he thought they had Sweat enough. In the mean time he gave them Diet that was most Nourishing. With this Remedy many desperate Diseases were cured, and the sick person upon the Use of this Physick improv'd, so as to appear younger and lustier after it. But we could never prevail, neither by Mony, nor intreaty nor foul means upon him to shew us the Plant.

Ad pag 227. *Mira* &c. Wonderful things are daily found out in Physick to the Confirmation of the Operation of the Learned Naturalist *Petrus Servius*'s Weapon-Salve. For he assured us that a piece of Cloth dipt in the Blood, and put under hot Ashes stops the Monthly Flux, the Experiment having been often

prov'd.

prov'd. And my Master *Petrus Castellus* affirmes that He found by Experience, that the *Hæmorrhoids* if they were touch'd with the tuberous Root of Chondrilla, did dry away if the *Chondrilla* dry'd, and did Run to Corruption if the *Chondrilla* was corrupted. And therefore after such, touching of the Hemorrhoids the *Chondrilla* was usually put to dry in the Chymny.

Ad pag. 229. *Podagra* &c. The Gout is strangly eas'd if Puppies lie with the Person that hath the Gout, for they contract the Disease so as not to be able to go, but the Patient thereby finds Ease.

Ad pag. 236. *Primo*, &c: At the first, Physick was accounted part of Philosophy, so that the Cure of Diseases, and the Contemplation of Nature, did both arise under the same Authors. Those being most set upon Medical Enquiries, which had made their Bodies infirm by disquieting thoughtfulness and nocturnal Watchings.

Ad pag. 204. *Est*, &c. Besides it is altogether drying, and therefore I should not despair that it, being hung about Childrens Necks, might cure the Falling-sickness in them. I truly saw a Lad, that sometimes would be eight whole Moneths free from the Falling-sickness, and then, when by chance this fell from off his Neck, he became immediately surprized with a Fit; and again, hanging another Root in its place, he would continue well: Therefore, for Experiment sake, I thought good to take it again from his Neck, which when I had done, and found that the Lad fell into his former Convulsions, we took a great piece of a green Root, and hung it about his Neck, and from that time He continued well and felt no more Convulsions. It was therefore most probable, either that certain parts did exhale from the Root, and were drawn into the Body by Inspiration, which did so work upon

upon the affected parts; or that the ambient Air was continually changed and altered by the Root: For after this manner the *Succus Cyrenaicus* cures the *Phlegmone* upon the *Uvula*; so Catarrhs and other Rheums are dry'd up by *Melanthium*, if it be tyed up warm in fine Linnen, and the hot fume of it be drawn up into the Noſtrils by Inſpiration. Nay, if you ſtrangle a Viper with divers ſorts of Threeds, and eſpecially with the Sea Purple, and then you tye thoſe Threeds about the Neck of your Patient, you ſhall cure the ſwelling of the Almonds of the Ears, and all other ſwellings in the Neck.

Ad pag. 257. *Peſtis Cayri*, &c. The Plague at *Grand Cair*, and in all parts of *Ægypt*, is wont to invade the Inhabitants from the beginning of the Moneth *September* until *June*: For in all theſe Moneths, from *September* unto *June*, the Plague from other Nations is brought thither, and is wont to infect that Nation: But in the Moneth of *June*, of what nature and how great ſoever the Peſtilence be, when the Sun firſt enters *Cancer*, it is immediately removed; which thing many (and that not without reaſon) take to be a particular Mercy of God. But (what is more admirable) all Houſhold-ſtuff, however infected with the Contagion of the Diſeaſe, at that time ſhews no effect of any Contagion, ſo that then the whole Nation paſſes into a moſt ſecure & healthy condition, from a morbid and dangerous: And then thoſe Diſeaſes, which are called by the Greeks *Sporadici*, begin to appear, which in no part of the World are ſeen to be rife together with the Plague.

Ibid. Hæc, &c. Theſe things are firſt obſerved about that time. From which, I think, and perchance not without reaſon, the cauſe of the extinction of the Plague, and the change of the ſtate from Morbid to Wholeſome doth depend; For no other of the conſervative Cauſes, which are wont to be called by

by Physitians, *Res non Naturales*, appeareth then, besides the Air; to which we may refer this change from Disease to Healthiness, and therefore we must refer this change to the change of the Air.

Ad pag. 259. The Inhabitants do strange things, both in preserving Health and curing Diseases, by Friction and Unction, using the first in cold and Chronical, the latter in acute Diseases. And Strangers who arrive there, are, as they ought, willing to imitate their ways of Physick, and by Rules of Art to preside and moderate these ways of Empirical Healing.

Ib. Cholera Sicca is Cured by the same Remedies, especially if their Horny Cupping-glasse be apply'd to the Region of the Liver, of which I must attest the same thing that *Galen* doth of Cupping-glasses; which he affirm'd to Work as Miraculously as if their Operation had depended on Enchantment.

Ad pag. 271. *Neque* &c. Nor doth he say that a Physitian needs nothing of Counsel or Deliberation, or that an irrationall Man may professe this Art. But that those Conjectures of hidden things are nothing to the purpose. Because it matters not what causeth the Disease but what removes it.

Ib. Interim &c. In the mean time the *Brasilian* Botanists make all sorts of Medicines of Simples they find every where in the Woods: which they make with so great Sagacity, and apply them both internally, and externally, especially to Diseases that Spring from Venome that a man may more securely give himself over to their hands then to our unskilful Physitians, who brag much of Secrets they have learn't in private, and for the knowledg of these will be called Rationals in Physick.

Ad pag. 272. *Fortassis*, &c. Perchance some Sciolist in Physick may affirm that these things may not be used by reason

ſon of the Narcotick and Stupefactive property. But theſe pretenſes are as vain in effect as ſpecious at firſt ſight: for beſides that the hot temper of this Country requires it; It is ſure, that without theſe Remedies there can be no Cure. Adde that here we prepare *Opium* ſo well that you may give it to an Infant. And truly, if in Hot Diſeaſes we had no Opiats we ſhould in effect find that the uſe of all other Medicaments would prove altogether vain and fruitleſſe.

Ad pag. 287. *Si medicinam* &c. Such was the Origin of Phyſick, by the Recovery of ſome and the Death of others it firſt made diſtinction between things Soverain to heal, and things which were Improper, and Deadly. And thus the Remedies being found out, Men began to diſpute of the Reaſons of them. Nor was the Art of Medicine found out by the light of Reaſon, but Medicine being found, the Reaſon began to be enquired into.

Ib. Ubi res &c. Where the Matter is certain, if it be againſt the common Opinion, the Reaſon muſt be ſought, and not the Matter of fact ſcrupled.

Ad pag. 297. *Pauciſſimos* &c. You will find very few of thoſe who dwell at the *Spaa* who are troubled with the Headach, Stone, Obſtructions of the Kidnies, Liver, Spleen, or Meſariaick Veines, none at all who were troubled with the Jaundice, Dropſie, Gout, Itch, or Falling ſickneſſe.

Ib. Inter cætera &c. Among other Qualities it moveth the Monethly Evacuation as hath been prov'd by a thouſand trials. And yet it ſtops the immoderate Flux of them more happily then any other Medicine.

Ad pag. 299. *Rerum* &c. The Contemplation of Nature, though it maketh not a Phyſitian, yet it fits him to learn Phyſick.

FINIS.

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